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Packaging design for glass blowing products, Bangkrabao glass knitting occupational group, Nakhon Chai Si district, Nakhon Pathom province

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Abstract

The objective of this research is to design the packaging of blown glass products Bangkrabao glass knitting Occupational Group, Nakhon Chai Si District, Nakhon Pathom Province, and to test the package performance. This research is Research and Development: (R&D). The results showed that blown glass products of Bangkrabao glass knitting Occupational Group have many products depend on customers' needs in natural forms and appliance forms and can divide into 3 sizes according to the average weight of the products The main problems for glass entrepreneurs are the products can be broken easily and fragile. Therefore, wrapping the products with cushioning material such as compressed air plastic sheet, mulberry paper, and packing into a corrugated paper box in a separate compartment can prevent shock then transport by car. The designed packaging has a structure made from 1-layer single wall corrugated, natural colored, wavy type B paper grade KI125/CA125/KI125 and the inner packaging made of 1-layer corrugated sheet, wavy type E-paper grade KI125 / CA105 / KI125 with flexible PVC plastic 11 microns thickness, seal with staples. Experts' opinions on the of 5 developed blown glass products packaging found that in the overall package form no.1 and no. 2 are in a high level with the same mean (Mean= 4.27) and the standard deviation equal to 0.57 and 0.88 respectively. The compression strength test results the developed blown glass product packaging found that the package has external dimensions of 279 x 241 x 100 millimeters under test conditions at 27 ± 1 degrees Celsius, relative humidity 65 ± 2 percent. It can be concluded that form no.1 can withstand a pressure force of 412 kilograms, which is the most from all 5 forms before the package collapse and become deformed and followed by form no.2, no. 5, no. 4, and no. 3, respectively.

Keywords: Packaging design, blown glass products, Bangkrabao

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Introduction

The packaging is a material or container used to keep or pack items for storage, use, transportation, marketing, and distribution. The package as a way of transporting goods from the production source to the distribution point [1] onsistent with Prachid Tinnabutr [2] concluded that packaging is important in the transportation economy and distribution for all types of products. More than 70% of products require packaging in one form to protect the product from external conditions, to maintain product quality as long as possible, and to allow the convenience in bringing products to use. Packaging also contributes to increasing product value and urging demand for marketing results as well. It can be seen that packaging is important for all types of products especially products from One Tambon One Product which is a product that reflects identity and local knowledge in each area. Glass blowing products are also products that are unique and has value in themselves because they are art invention products and also it can be souvenirs which high sales rate and popular both domestic and abroad. The opportunity to distribute products to sell outside the area is high but according to a study from the Department of Industrial Promotion found that entrepreneurs often encounter problems with the packaging used in distribution and finding suitable transportation for the product. Therefore, it is the reason why entrepreneurs try and get some errors with the packaging. The error on trial gives negatively affects the cost of production because it can damage the products and increase a higher cost from products being returned up to 10 - 15 percent [3]. Therefore, packaging always plays an important role for blown glass products in keeping them in perfect condition in transportation from the production area to the distribution area or consumers.

Glass blowing products is an outstanding product with uniqueness and valuable in itself which can be a gift for various occasions. Bangkrabao glass knitting Occupational Group, Nakhon Chai Si District, Nakhon Pathom Province has products to sell by delivery, selling at an exhibition organized by government agencies. Their product is packed with newspaper wrapping and put in a box. The group often encounters problems of product breakage due to transportation, so they have the same opinion that the old packaging of their products cannot prevent breakage of their blown glass products due to the physical characteristics of glass that is fragile and a high risk of breakage shape. Although the products are protected by inserting cushioning into the structure of the package. The listed problems made the researchers interested in studying and developing glass-blown product packaging which will help protect the products to decrease damage from broken during transportation and reduce the cost of repetitive production to replace the damaged products.

Objectives

1. To design the packaging of glass blowing products of Bangkrabao glass knitting Occupational Group, Nakhon Chai Si District, Nakhon Pathom Province.

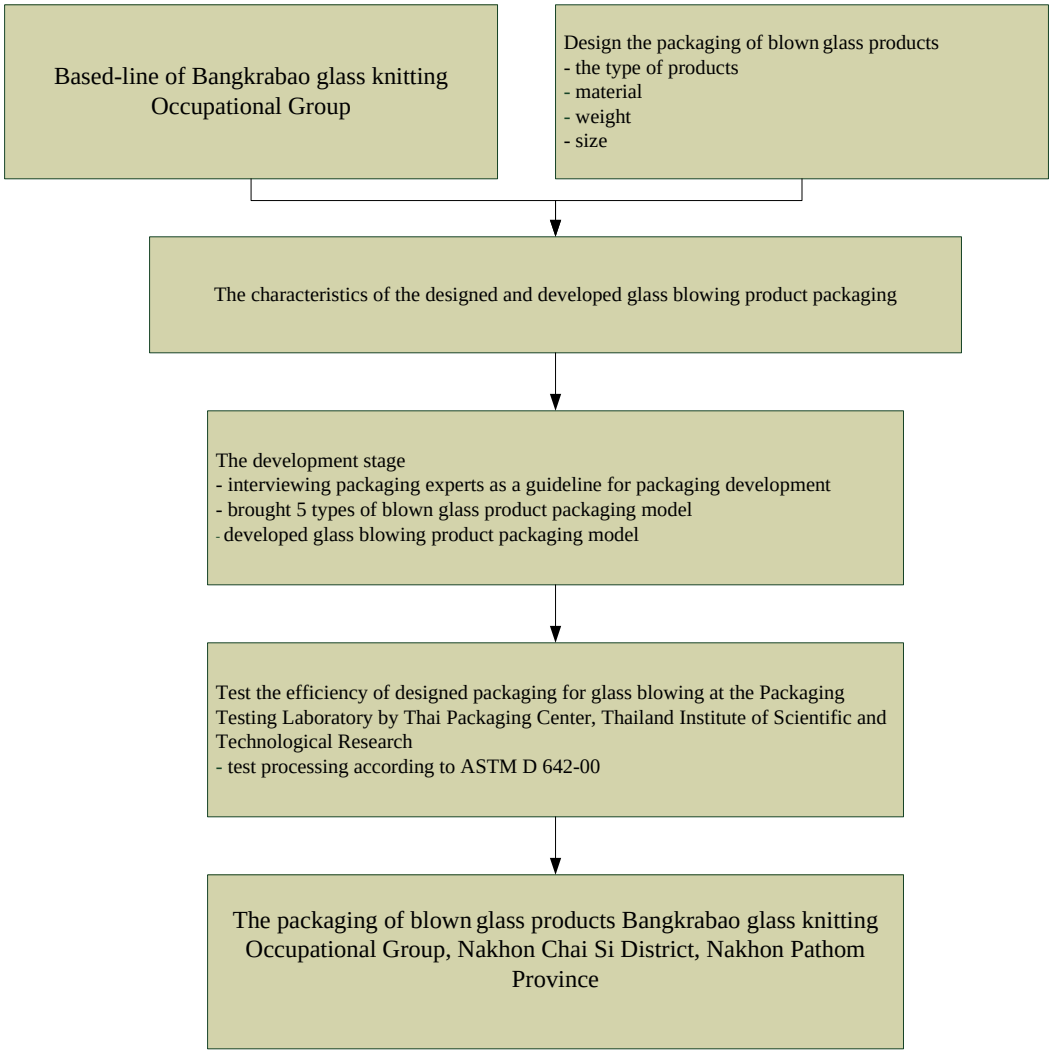
2. To test the efficiency of designed packaging for glass blowing.

Methodology

Population and Samples: Consisting of (1) Leader of Bangkrabao glass knitting Occupational Group, Nakhon Chai Si District, Nakhon Pathom Province by specifically selecting 5 people. (2)11 members of Bangkrabao glass knitting Occupational Group, Nakhon Chai Si District, Nakhon Pathom Province. (3) A group of 2 packaging design experts from the specific selection.

Tools and Data Collection methods**:** This study uses a participatory action research and development model with in-depth interviews and a semi-structured interview to be a research tool. The researcher studied, collect documents and study related research by examining the content validity (IOC: Item Objective Congruence Index) by experts to check the consistency and then bring the results to calculate the consistency between the questions and objectives.

Data synthesis and analysis by categorize information and check the correctness and completeness of the recorded data to facilitate in analysis various data from studied with descriptive writing. In analysis the data, the researcher has emphasized qualitative data as the main analysis by bringing the collected content to connect with the related research presented in the chapter of literature review and test processing according to ASTM D 642-00 (Determining Compressive Resistance of Shipping Container, Components, and Unit Loads) at the Packaging Testing Laboratory by Thai Packaging Center, Thailand Institute of Scientific and Technological Research



Picture 1 Conceptual framework

Research result

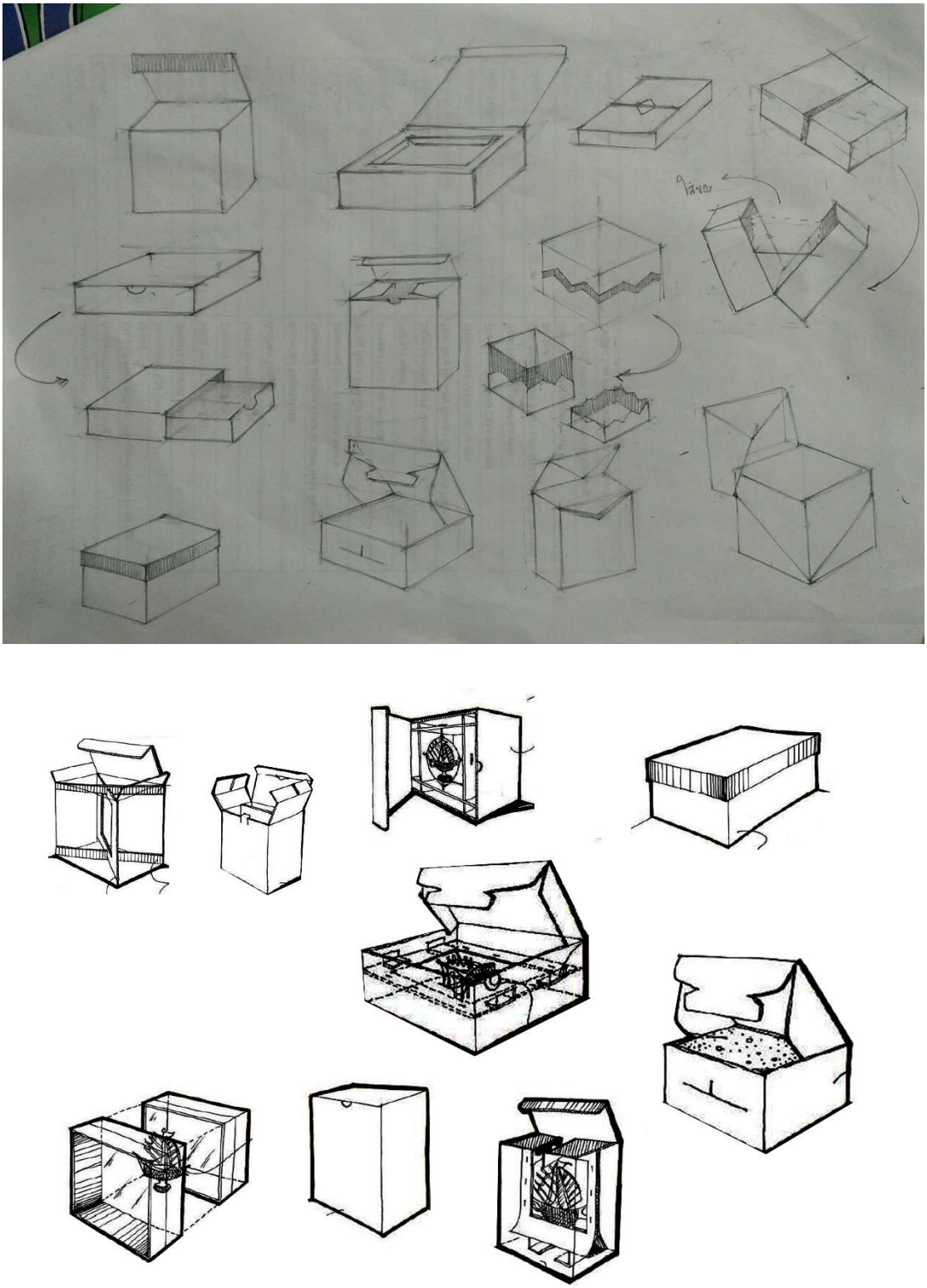
1. Bangkrabao glass knitting Occupational Group located at No. 83, Moo 2, Bang Krabao Subdistrict, Nakhon Chai Si District, Nakhon Pathom Province. This group started Glass Knitting Career Group in 1997with Mrs.Thippawan Saengampai as the group president. There are currently 16 members in the group. As for the production speed (Number of pieces/time) depending on the type of product as Medium-sized knitted glass can be produced in the amount of 20 - 30 pieces per day, a Small Piece of glass can produce approximately 100 pieces per day. The main material used solid glass block material and glass tubes in production. The production is from human labor. The product forms of the group are divided into 2 major groups, which are natural forms such as animals, plants, flowers, etc. and the appliance forms such as vases, cars, boats, etc. in a variety of sizes depends on the customer's need. The average weight of small glass blowing products, average weight not more than 100 grams, medium size, average weight around 200 grams and a large size average weight around 500 grams. Glass blowing products, available in a variety of colors depending on the decoration needs. The distinctive feature of the blown glass product is its beautiful appearance, it's forming by pulling the glass rod into strips, then weave it into products, which requires skilled labor and exquisite workmanship because it is a specialized skill with effort and practice for a long time. The weakness or the main problem of the product is its fragile and can be broken easily. The method of packing the product is wrapping the product with cushioning material such as compressed air plastic sheet, mulberry paper and then packed into a corrugated carton that divided into compartments to prevent shock and transport by car. There are 4 sizes of packaging that are currently used by the characteristics of various types of blown glass products.

2. The characteristics of the designed and developed glass blowing product packaging are the external structure of the die-cut box made from 1-layer single wall corrugated sheet, wavy type B paper grade KI125/CA125/KI125, and the inner packaging made of 1-layer corrugated sheet (Single Wall), wavy type E-paper grade KI125 / CA105 / KI125 with flexible PVC plastic 11micron thickness, sealed with staples.

2.1. Early development is the study of basic information to guide the development of packaging, found that the group suggests that the packaging must have the ability to protect the product during transportation and storage. The package developer should choose materials that absorb shock before passing through the product or choosing materials that will prevent impact by fixing the glass products to stay without contacting with other hard materials. The structure of the package should be larger than the products to protect the products from external shocks, prevents impact from hard materials such as the sidewalls of the box. Finally, the package should prevent the products from moving and the cushioning material should be foam, plastic, paper, or other resistant materials that bear impact and separates shocks before reaching the products.

2.2. The development stage consists of interviewing packaging experts as a guideline for packaging development. Then the researcher brought 5 types of blown glass product packaging models to conduct further research by studying the opinions of experts on the developed 5 blown glass product packaging to select only the most suitable packaging for further performance testing.

2.3 Hand sketching include 10 styles.



Picture 2 Hand sketching

Table 1 Details of the 5 models of the developed glass blowing product packaging model

Form No.	Packaging model image	Specific characteristics
1	 	1.The external structure of the die cut box made from 1-layer single wall corrugated sheet, wavy type B paper grade KI125/ CA125/ KI125. 2. The inner packaging made of 1-layer corrugated sheet (Single Wall), wavy type E paper grade KI125 / CA105 / KI125 with flexible PVC plastic 11 micron thickness, sealed with staples.
2	 	1.The external structure of the die cut box made from 1-layer single wall corrugated sheet, wavy type B paper grade KI125/CA125/KI125 2. The inner packaging made of 1-layer corrugated sheet (Single Wall), wavy type E paper grade KI125 / CA105 / KI125 with flexible PVC plastic 11 micron thickness, sealed with staples.
3		1.The external structure of the die cut box made from 1-layer single wall corrugated sheet, wavy type B paper grade KI125/CA125/KI125 2.The inner packaging made of 1-layer corrugated sheet (Single Wall), wavy type E paper grade KI125 / CA105 / KI125 with flexible PVC plastic 11micron thickness, sealed with staples.

Form No.	Packaging model image	Specific characteristics
		
4		1.The external structure of the die cut box made from 1- layer single wall corrugated sheet, wavy type B paper grade KI125/CA125/KI125 2.The inner packaging made of 1-layer corrugated sheet (Single Wall), wavy type E paper grade KI125 / CA105 / KI125 with flexible PVC plastic 11micron thickness, sealed with staples.
5		1.The external structure of the die cut box made from 1-layer single wall corrugated sheet, wavy type B paper grade KI125/CA125/KI125 2.The inner packaging made of 1-layer corrugated sheet (Single Wall), wavy type E paper grade KI125 / CA105 / KI125 with flexible PVC plastic 11micron thickness, sealed with staples.

3. Experts' opinions on the 5 developed blown glass products packaging found that in the overall package form no.1 1 and form no.2 are at a high level with the same mean value (Mean= 4.27) and have the standard deviation equal to 0.57 and 0.88, respectively, followed by packaging form no. 5 with high value (Mean= 4.18; S.D = 0.85). packaging form no. 4 with high value (Mean = 4.15; S.D = 0.72) and packaging form no. 3 with high value (Mean = 3.91; S.D = 0.72).

4. The compression strength test results of the developed glass blowing product packaging: the package has external dimensions of 279 x 241 x 100 millimeters under test conditions at a temperature of 27 ± 1 degrees Celsius, relative humidity 65 ± 2 percent. In conclusion, package form no.1 1 can withstand a force of 412 kilograms of pressure, which is the most from all 5 forms, before the package collapse and become deformed, followed by form no.2, no. 5, no. 4, and no. 3, respectively.

Summary and discussion

This research is a packaging designed of glass blowing products of Bangkrabao glass knitting Occupational Group, Nakhon Chai Si District, Nakhon Pathom Province. It is research in the form of research and development (Research and Development: R&D). The researcher studies in the area to find information about the product and found that glass blowing products are handicraft products with exquisite, beautiful, and various formats. The main problem for glass blowing product operators is products are fragile and easy to be broken during transportation. It is consistent with the study report from the Department of Industrial Promotion found that the entrepreneurs of glass blowing products faced the problem with the packaging used in distribution and finding suitable transportation for the product, which affects negatively to the cost of production [3] and buyers may have a negative attitude toward buying glass blowing products because of the fear of repeated damage. Therefore, the main issue is an urgent need in packaging that can protect the blown glass products from breakage and damage. The entrepreneurs need to use packaging which is effective in protecting the products for the first thing. As for the graphic format, it will gradually develop because beautiful graphic printing on corrugated sheet packaging has a high cost in production and the community entrepreneurs have a limited budget for packaging production. Therefore, the packaging that is emphasized on the structure is important which is consistent with Jitsin Apirakmontri [4] concluded that when designing packaging for local products or communities, it is important to consider the suitability of the product, manufacturer, and the need in using before packaging design. Consistent with Boonsom Thanyanithiwat [5] Chairat Aswangkun [6] Kesmanee Manthamkan and Jirawan Sukphat [7] concludes that creating packaging requires a comprehensive study of all product-related information because the information can help packaging development to be successful. In the development of glass blowing product packaging prototype development, the researcher created a model to test the efficiency which is a structure made from 1-layer single wall corrugated, natural colored, wavy type B paper grade KI125/CA125/KI125 and the inner packaging made of 1-layer corrugated sheet, wavy type E-paper grade KI125 / CA105 / KI125 with flexible PVC plastic 11micron thickness. The packaging is strong and can protect the glass blowing product very well, convenient to use, suitable for the product, production process, and usage. It is consistent with the Thai Packaging Center [8] [9] [10] and Boonsom Thanyaniwat [5] conclude that the development of packaging in production: packaging can be manufactured in an industrial system, get standard quality and used strong materials in the production, able to support the product very well and has a reasonable price.

Testing of Packaging Performance of Glass Blown Product Developed in the laboratory can conclude that the developed package can protect the inside of blown glass products efficiently. From the usability testing by allowing the operator to pack the products on developed packaging and make actual transportation, it showed that the packaging can protect the inside of blown glass products efficiently follow with the test results of the Thai Packaging Center that confirm the results of development to ensure that the designed and developed packaging has the best performance.

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