

LATEX PROCESSING FOR CREATIVE PRODUCT DESIGN

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ABSTRACT

The objective of this research is to study the properties of latex and find out the process of processing latex as a design material. Focusing on the study and experimentation of latex processing, it was found that latex has the properties of elasticity, high tensile resistance, and high tear resistance. High bouncing, high stickiness Due to its electrical insulation, chemical resistance, and deterioration resistance, it is appropriate to apply the properties of latex to product design.

The experiment found that the right ingredients consisted of 1) latex (30 ml), 2) sulfur (30 ml), 3) ammonium bicarbonate (2.5 ml), and 4) nanozinc oxide (5 ml). Steamed with vinegar will cause the latex to set. The resulting material has properties such as resembling a sponge, being able to absorb water, and removing watermarks. When squeezed, it can be loosened and restored to its original state. It is also possible to mix colors and scents. The color should be used as acrylic, which gives a dark color due to the high concentration of the color. The scent should be a water-based fragrance, and both color and fragrance should be mixed into the latex before steaming, which will result in an even color and a long-lasting scent. It is important to consider the form of the product because latex has limitations in thickness or shrinkage that will shrink by 2-3 centimeters within 1 week.

Keywords: Design, Products, latex

INTRODUCTION

Latex is a natural material with unique properties and characteristics, such as having anti-bacterial substances and being able to resist dust mites. It has high elastic properties. It has a very high tensile strength value. without the addition of reinforcing agents and high tear resistance. High thermal or electrical conductivity, etc. This makes it highly utilized. (Noppachai Pujirakasem, Noppadon Sangwalpetch, 2023) Thailand is the world's No. 1 exporter of latex and latex products, but most of its latex exports are in the form of primary processed raw materials, which have low added value. While other countries cannot grow latex, they instead use Thai latex to produce products and send them back to sell in Thailand. As a result, Thailand loses the opportunity to make money in the country. Therefore, a plan was devised to solve the problem of latex. By processing latex into products that are modern and meet the needs of consumers, (Thailand Institute of Scientific and Technological Research, 2023)

Home decoration products are an important factor for buildings and businesses, coupled with the increasing population and expansion of residential construction projects. The need to use home furnishing products for both convenience and decoration is increasing correspondingly, and having a comfortable and beautiful residence that can satisfy utility as well will increase the quality of life. In particular, choosing home décor items that are in harmony with the environment in the room can help promote the atmosphere in that room as well. In an era where technology has replaced traditional human labor production, As a result, the products that come to market are of high quality. The appearance is similar. Therefore,

manufacturers are alert to creating production strategies to stand out. It is unique to differentiate the attractiveness of the product. Under the concept of creative economy and creating a conducive atmosphere to create a business from the combination of knowledge, Arts, culture, and technology to become a sustainable creative city (Khanin Phriwanrat, 2020)

It can be seen that latex has properties that can be used in the design of decorative products and can add value to products that meet the needs of society today and in the future. By combining the unique properties of latex in terms of flexibility with technology and design to guide product design, it can also enhance products that create added value in modern life. And it is an alternative to government agencies. This can promote the development of existing and new products with potential that focus on creating added value from latex as well as latex by-products for maximum utilization and creating new products as an alternative for producers and consumers.

OJECTIVES

- 1) To study the properties of latex
- 2) To find the process of processing latex for design materials

RESEARCH SCOPES

Content Scope

- 1) Study the characteristics and properties of latex
- 2) Study information about the design style of latex products
- 3) Study latex molding techniques and other techniques in latex product design

METHODOLOGY

Step 1: Study information about latex and its properties by studying various sources such as books, journals, magazines, theses, research articles, and online media.




Step 2: Experiment with the latex molding process for use in design.

- 1) Experiment with the characteristics and properties of latex.
- 2) Experimental molding of latex
- 3) Test the properties of the resulting material.

RESULT

Studies have shown that latex has outstanding properties of flexibility, high tensile resistance, and high tear resistance. High bouncing, high stickiness Due to its electrical insulation, chemical resistance, and deterioration resistance, it is appropriate to apply the properties of latex to product design.

Table 1: Experiment with latex molding

ingredient	image	Experimental results
1) latex 30 ml. 2) Nano Zinc Oxide 5ml		1) The material does not rise to fluff into shape. 2) It takes a long time to dry. 3) There is a pungent smell of latex. 4) Inability to absorb water
1) latex 30 ml. 2) Nano Zinc Oxide 5ml. 3) Ammonium Bicarbonate 2.5ml. 4) sulphur 30ml. 5) vinegar 200 ml.		1) The material resembles a sponge and can absorb water and remove watermarks. 2) The material, when squeezed, can be loosened back to its original state. 3) The material has the smell of latex.
1) latex 30 ml. 2) Nano Zinc Oxide 5ml. 3) Ammonium Bicarbonate 2.5ml. 4) sulphur 30ml. 5) Dipropilin glycon 2.5ml		1) The material does not take long to set. 2) The material has characteristics that can be stretched or shrunk. 3) Can be squeezed and restored



From Table 1, the experimental process, it was concluded that the appropriate experimental process when mixing the material is that it is soft, can be twisted, resembles a sponge, and also absorbs water. The ingredients are as follows: 1) Latex 30 ml; 2) Nano Zinc Oxide 5 ml; 3) Ammonium Bicarbonate 2.5 ml; 4) Sulfur 30 ml; and 5) Vinegar 200 ml.

From the experimental process in Table 1, the results of the experiment still have the disadvantage of having the smell of latex, so the experiment was used to increase the smell and color of the material to make it suitable for use in product design, as shown in Table 2.

Table 2: Flavoring experiments

Types of perfume	process	Experimental results
water	Mix with latex and steam.	It can reduce the smell of latex. The smell is long-lasting.
	Spray after steaming.	There is a faint smell, and the smell does not stick for long.
oil	Mix with latex and steam.	This causes the tires to clump. It cannot be molded.
	Spray after steaming.	It can reduce the smell of latex, but the smell does not last long.

Table 3: Color experiments

process	image	Experimental results
Spray painting		<ol style="list-style-type: none"> 1. The color is not dispersed, and when discarded for a while, the color becomes darker. 2. The material is firmer than the uncolored one.
Mix in latex		<ol style="list-style-type: none"> 1. When steaming is finished, wait for it to dry by itself; the color will not fall and will not soften.

From Tables 2 and 3, it was found that the perfume that can mix and reduce the smell of latex well is a water-based perfume, which should be mixed with latex and then steamed to form a mold. As for the paint, it should be mixed with latex and then steamed as well. It will be able to obtain a uniform color and not spoil the properties of the material.

Based on the results of the experiment, The process of processing latex for use as a design material can be shown as follows:

- 1) Mix and beat into a homogeneous mass of 100 ml of latex. Sulfur, 30 ml. Ammonium bicarbonate, 2.5 ml.
- 2) Once mixed, mix and beat well with 5 ml of Nano Zinc Oxide.
- 3) Mix colors and scents.
- 4) Take the ingredients from items 1–3 and beat them together to form a fluffy (foamy and evenly colored).
- 5). Take the resulting mixture and pour it into the prepared blocks.
- 6) Mix 50% vinegar and 50% water into the steamer (use as an ingredient instead of water for steaming to make the latex set).
- 7) Take the prepared latex block and place it in an autoclave. It takes an hour to steam.
- 8) Remove it from the autoclave, let it cool, and remove it from the blocks. You will get latex material, as shown in picture 1.



Figure 1. Prototype of latex material

Table 4: Material Test Results

	No.1	No.2	No.3
Indentation hardness index, N	329.7	963.6	620.9
Fatigue by constant-load pounding			
- Loss in indentation hardness index, %	19.4	-4.2	2.0
- Loss in thickness, %	10.6	2.3	8.2
Accelerated aging			
- Increase in indentation hardness index, %	449.6		
Compression set, %	13.4		
Total content of natural latex , % by weight of Total solid latex	100		
General characteristics	* Not pass		
Density , kg/m	284.5		

CONCLUSIONS AND DISCUSSIONS

Experiments were conducted on processing rubber to determine its suitable properties. It was found that the mixture consisted of latex as the main material. Mixed with sulfur, ammonium bicarbonate, and nanozinc oxide, the proper process is to blend the mixture to fluff up and steam it with vinegar for 1 hour. The resulting material can be squeezed and loosened back to its original state. It is also possible to mix colors and flavors to create an aesthetic effect on the product.

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