

The innovative application study on eco-packaging design and materials

Yong Min CUI¹, Xin Guang REN^{2,a}

¹ Rongcheng College, Harbin University of Science and Technology, Rongcheng; Shandong, China

² Rongcheng College, Harbin University of Science and Technology, Rongcheng; Shandong, China

Abstract. The paper solves the increasingly deteriorate environmental problems by positively exploring how to utilize and develop eco-packaging design reasonably. The paper explores an effective method that combines eco-packaging and environmental protection materials, hoping to define the sustainable development road of packaging design. The paper is centered on the design application of eco-packaging and environmental protection materials, applies and analyzes the method to obtain innovative design requirements and development tendency of eco-packaging design by analyzing status and significance of eco-packaging design, combining with the development and main types of eco-packaging packaging materials, and based on the achievements acquired by eco-packaging and environmental protection materials. Meanwhile, the paper also reveals mutual dependence and mutual promotion of eco-packaging design and eco-packaging materials.

1 Status and Significance of Eco-packaging Design

1.1 Status of Eco-packaging Design

The generation of environmental design idea in the end of 1980s guided a new international design wave. Therefore, eco-packaging design has been generated correspondingly. Meanwhile, people also gradually realize that eco-packaging plays a positive role on natural environment and resources in their daily life. By constantly developing eco-packaging design, designers realize that packaging materials play a dominant role on the packaging design. Lots of successful eco-packaging designs have already concentrated on environmental protection and recoverability of packaging materials in the design concept. In the packaging design, innovative design techniques and new environmental technology are fully utilized, so as to satisfy packaging requirements and environmental requires of products.

Secondly, laws and regulations relating to eco-packaging materials have acquired greater development in recent years. The first sign (Der Grüne Punkt namely environmental pattern of product packaging) relating to eco-packaging in the world was generated in Germany in 1975. In later several decades, eco-packaging has been rapidly developed around the world until Environmental Control Board was officially established in ISO and eco-packaging standard was formulated officially in 1993. The standard was officially implemented in Jan. 1996 in the global. In recent decades of years, the developed countries have adopted measures successively and

^a Xin Guang Ren:renxinguang12@163.com

formulated laws and regulations about packaging. At present, packaging organizations around the world make efforts required by the ISO, research and develop new materials and new technology constantly.

In addition, with the social development in recent years, environmental consciousness from enterprises to designers, as well as the public has been greatly improved. Many new materials, new technologies and new packaging design idea have been utilized and acquired good performance. Designers adopted more environmental design ideas and techniques in a great number of product packaging designs, but the eco-packaging design is still encountered with further development space.

1.2 Significance of Eco-packaging Design

The eco-packaging occurrence indicates that designers attach importance to ecological environment and even embodies the urgent requirements of consumers for environmental protection. The product packaging design of environmental protection is related to future living environment of humans and has stronger practical significance. Reasonable utilization and development of eco-packaging design can save resources, protect environment, promote ecological sustainable development, and create a good life condition.

1.2.1 Realistic Significance on Developing Packaging Design

First of all, eco-packaging runs through the entire link of production, sales and utilization for products. The generation of eco-packaging promotes the further development of packaging design, points out the developmental direction of packaging design in the future, and develops a unique style in various schools of packaging design field. Secondly, eco-packaging design plays an important connecting role on the production and utilization process of eco-packaging. After a commodity is produced and completed, a designer designs it by blending in environmental idea in line with characteristics of the commodity and demands of producers. Then, the commodity is sold to consumers, and environmental idea is transmitted to consumers. As a result, eco-packaging design plays the guiding significance on the development and progress of packaging design. Thirdly, people have already had relatively mature environmental consumption behaviors from a radical environmental concept after entering into the 21st century and bring a new opportunity to develop eco-packaging, so that eco-packaging design trend with idealism gradually has realistic significance. With the constant packaging development, there is a definite requirement for eco-packaging design of products in the future. Obviously, it will present a brand-new page of packaging design.

1.2.2 Social Significance Generated by Eco-packaging

Eco-packaging is equipped with bright social significance. Commodities walk into thousands of households through complete environmental packaging. Thus, the environmental idea transferred by eco-packaging is also generalized with it. Consumers have already accepted propaganda of environmental idea, while getting commodities. Moreover, they become direct participators of environmental protection, improving consumers' consciousness of environmental protection. The packaging design of numerous products just pays attention to visual effects of product packaging, but neglect design of product functions and social property. It depends on excessive flaunty and wasteful packaging to attract consumers to some extent. However, such the excessive packaging design has already seriously threatened natural and ecological environment of human life. Facing to environmental pressure, people have already increasingly paid attention to green and environmental protection of product packaging. Under the promotion of green consumption, an increasing number of consumers select environmental green products. Adoption of eco-packaging products is easy to be accepted by consumers. Undoubtedly, there is a close relation between eco-packaging and consumers. As a result, the development of eco-packaging design definitely will guide the concept of consumers and promote constant progress of the society.

2 Characteristics of Eco-packaging Materials

Any kind of packaging design can't do without packaging materials. Only to fully know about eco-packaging materials and select environmental protection materials reasonably can it promote the constant development of eco-packaging design.

2.1 The Development of Eco-packaging Materials

Humans have a long history of packaging products with environmental protection materials. In the past, humans applied lots of packaging materials, which conformed to an environmental idea in our opinions. Moreover, some eco-packaging ways have already been used until now and they are deserved to be learned and referred by packaging designers. For example, Japanese natto packaging is a good traditional packaging design. It applies straws to regard as the natto packaging materials. Straws are necessary materials for natto fermentation. Moreover, sources of straws are extensive and reliable. After using straws, they can be abandoned in nature and are easy to be decomposed, making natto packaging is natural, kind, environmental and health.

Before the revolution of industrialization, lots of packaging materials are derived from nature directly and have smaller environmental pollution. However, all of these are based on consuming lots of natural resources. For example, woods and leather products are utilized in mass. From the perspective of a new environmental idea, it still needs to be further improved. With the constant development of social economy and technology, as well as constant innovation of technology, environmental protection materials also have new changes. Particularly, research and development of environmental protection materials in recent years have acquired outstanding progress in the improvement of traditional packaging materials.

2.2 Main Types of Eco-packaging Materials

With the development of industrialization and increasingly prominent environmental problems, the design idea of eco-packaging design also has a new change. People think that it is necessary to develop eco-packaging materials under the precondition of protecting natural resources. Moreover, eco-packaging materials in new period should be free of contamination, can be recycled, and should not depend on new requirements of natural resources excessively. Western countries apply biotechnology and genetic technology, etc., technical means, so eco-packaging materials develop rapidly. With the application of lots of new-type eco-packaging materials, eco-packaging design has been greatly changed from design ideas and techniques. Many design ideas and techniques can be performed by applying new materials. Eco-packaging materials have a profound influence on environmental design. Nowadays people mainly apply the following categories of eco-packaging materials:

2.2.1 Degradable Materials

Under the specific environment of causing performance loss, a material of which chemical structure is changed within the specific time is called as a degradable material. For example, after degradable materials are used, they are restored and degraded through the function of UV-light or microbial action and return to the natural environment in a non-poisonous form. Beets are used to make degradable materials in France, which are made into ecological packaging boxes, possess some advantageous characteristics of physiolysis, rapid decomposition and non-toxin property and won't cause pollution to the environment.

2.2.2 Recycling Materials

Recycling materials mainly refer to the packaging materials that can be recycling, used repeatedly and regenerated. For instance, glass is the repeated and regenerated packaging material. Glass packaging is equipped with some advantages, such as stronger visuality and easy to recycle, and has already become a main vessel of traditional packaging. After using, glass bottle can be used repeatedly by recycling disinfection system, having stronger environmental effects.

2.2.3 Upgrade of Traditional Packaging Materials

The upgrade of traditional packaging materials means that materials depend on modern technology to transform and update techniques on the basis of traditional packaging materials. Based on modern technology, China develops new-type packaging materials to replace traditional wooden packaging materials constantly. For example, new-type packaging materials are developed by virtue of wood flour, cotton and linen, bamboo, reeds, straws, wheat straws and corn bran, etc. This not only utilizes resources reasonably, but also protects natural resources.

One of main methods to update and replace traditional packaging materials is to expand varieties of packaging materials constantly and improve technical content of packaging materials. For example, strawboard made by processing straws not only is energy-efficient, chill-proof, heat-resisting and sound-proofing, as well as has good permeability and stronger shock resistance, but also performs excellently in waterproof and shock resistance and is convenient for packaging and transportation.

3 Innovative Design Application of Eco-packaging Design

In order to develop eco-packaging career constantly, designers must innovate design thought constantly, update design ideas continuously, and maintain high social responsibility, so as to innovate product packaging with a responsible attitude and method, transfer green and humane idea and spirit to consumers, and promote people's ideology on eco-packaging constantly.

3.1 Application of Simple Design Philosophy in Eco-packaging Design

Simple design needs designers to analyze and design required factors seriously, comprehensively and objectively on the basis of knowing about psychological life and economic ability of audiences and conducts reasonable and proper design on items from multiple aspects, including functions, materials and colors, so that designed packaging has proper product protective function, suitable materials, and reasonable costs. The essence of simple design is to make products reflect their value accurately, cater to consumption demands of consumers, but not decorate unnecessarily, so as to solve some problems generated by "excessive design". Simple design also respects and protects nature. There is a symbiotic relationship between humans and nature at the very beginning, but human activities destroy the relationship. Moreover, the contradiction and conflict between humans and nature are increasingly serious. Thus, we propose an idea of harmonious co-existence between humans and nature. Simple design exactly doesn't cause larger damage, but conforms to harmony between humans and nature and development of human society.

Designers should blend social responsibilities into the design process, but can't design for designing. Nowadays, packaging design presents the tendency of excessive packaging. Resources consumed by packaging also attach importance of humans. Though there is no definite definition about excessive packaging, designers should try to promote simple design.

3.2 Embodiment of Humanization Design in Eco-packaging Design

The concept of design humanization has already been proposed with the core of paying attention to various demands of humans. The ergonomics has already been mature. In terms of eco-packaging, humanization of eco-packaging design should pay more attention to pursuing for social value. In the pursuit for social value of contemporary people, it can't neglect the pursuit for environmental protection and sustainable development.

The significance of humanized eco-packaging design lies in concerning comprehensive social value of commodity packaging and satisfaction of human spirit and emotional demands, except that products should satisfy basic functions of substances. Because modern consumers pay more attention to packaging or even feel product quality by packaging, when they purchase commodities, such as cosmetics and gifts, visual effects of packaging will be associated with product quality in consumer opinions. Packaging satisfies spiritual needs of consumers to a large extent. Moreover, in the further present and bestowal, etc., links, packaging has a larger satisfaction on spiritual level. If eco-packaging can't satisfy demands in these aspects, it is hard to realize. Thus, designers should study consumption mentality of consumers for different products, study application of design techniques for human practical demands, and study different acceptance levels of different consumers

for new ideas. The method of humanization design lies in studying human characteristics and demands of humans and combining with eco-packaging design. Meanwhile, eco-packaging design is the important perfection and improvement of humanization design.

3.3 Embodiment of Cultural Elements in Eco-packaging Design

It seems that product packaging is extremely important in modern international market. Packaging impacts quality image of products in human opinions deeply and becomes an important sign of brand material culture. In the design or product packaging, it generally should give consideration to materials, structure, modeling, colors and patterns, etc., elements. Moreover, packaging can be provided with functional value and aesthetic value through skillful conception and scientific utilization of these elements, so that consumers feel brand individuality and cultural connotations from it. Packaging design is also a kind of cultural behavior of humans. Therefore, it is necessary to conduct an in-depth study on different cultural backgrounds in different areas, find out elements utilized by packaging design, blend environmental ideas, and finally realize it through design. In this way, it not only is easy to acquire obvious effects of propaganda, but also is easy to acquire cultural identification of consumers.

Lots of packaging materials are equipped with profound cultural connotations, especially for time-honored materials with profound cultural background. Many materials nowadays are still deserved to be referred by our designers. These materials are mainly derived from nature. Moreover, they are easy to acquire and regenerate. For example, zongzi packaging in Chinese tradition is the characteristic traditional packaging design. Steamed rice dumpling leaf is regarded as the appearance. The south of China generally utilizes bamboo leaf, while north of China applies reed leaf as the raw material of steamed rice dumpling leaf. All of them come from nature. The fragrance of steamed rice dumpling leaf not only makes zongzi lead a person to endless aftertastes. Moreover, steamed rice dumpling leaf is easy to be degraded after it is abandoned in nature. All of fully embody the “theory that man is an integral part of nature” in Chinese traditional culture.

To sum up, with the constant development of industrial technology, new-type environmental protection materials promote the development of eco-packaging. Therefore, people should reinforce the development of eco-packaging materials and its application in packaging design, while advocating eco-packaging design. Meanwhile, with the proposal of new environmental thought, the environmental climax with the center of protecting environment and saving resources has already become an inexorable trend of world eco-packaging revolution. With the constant improvement of living standard and environmental cognition, people don't satisfy with aesthetic functions of product packaging, but pay more attention to environmental protection property

of product packaging. Undoubtedly, eco-packaging will bring a new lifestyle for commodities.

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