

The Green Bionic Design in Seafood Packaging

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Abstract: Combining green design and bionic design concepts to deepen the seafood food packaging design, explore more possibilities of seafood food packaging design in the new era through the application of new technologies and new materials. This paper elaborates the relevant concepts of green design and bionic design and the close connection between them, discusses the application of green bionic design in seafood packaging, and focuses on the analysis of how the bionic design concept can optimise the selection of materials, design conception and manufacturing process of the packaging by imitating the structure and function of nature, so as to reduce the consumption of resources and environmental pollution. Taking Xunpu village seafood food as an example, innovative green bionic packaging design suggestions are put forward through village food research study and similar seafood food packaging case study, in order to provide reference and inspiration for the sustainable development of seafood food packaging.

Keywords: Seafood; Green Design Concept; Bionic Design Concept; Packaging Design.

1. Introduction

Detailed research on various types of seafood packaging and then integrated bionics and green concepts, put forward the practical feasibility of green bionic seafood packaging design strategy for the future of the countryside to lay a solid foundation for the process of food packaging design. Focusing on reducing environmental impact and resource waste, the green design concept is an important trend in contemporary packaging design, and it is recommended to use biodegradable or recyclable materials, such as biodegradable plastics or recyclable cardboard, which can not only effectively reduce the negative impact of packaging on the environment, but also enhance the brand's image of environmental protection in the eyes of consumers. The use of bionic design concept draws on the wisdom of nature and structure, green bionic packaging design in the field of packaging can make a big difference, such as imitation shells, oysters, the structure of the design of durable packaging shells, not only to protect the seafood products, but also reduce the amount of packaging materials to reduce the cost of the use of bionic design can also make the packaging more artistic and creative, so that the product is more attractive in the shelves. Xunpu village seafood food packaging into these two design concepts, not only effectively enhance the competitiveness of seafood in the market, increase the total amount of food sales, indirectly promote the economic development of the food industry in the Xunpu village, but also friendly protection of the ecological environment of the village, so that the village of the overall sustainability of the development of the village as a good example of the development of a modern fishing village.

2. Design Concept Overview

2.1. Green Design Concept

Green design is the core idea of incorporating the concept of environmental protection throughout the entire design process, using design to solve supply problems while at the same time seeking to mitigate or eliminate the negative environmental impacts that may result. Its goal is to meet human needs for diversity, including material, natural

resources and the social and human environment, by changing traditional lifestyles and consumption patterns.[1]The 6R principles of green design include: Research, Reserve, Reduce, Recycling, Reuse and Regeneration. Integrate green design concepts into packaging, carry out green design, select green materials, implement green procurement, implement green manufacturing, green packaging, green transport, and do a good job in the recycling and disposal of discarded products, to achieve the Green environmental protection in the whole cycle of products. The realisation of green packaging plays a positive role in improving future economic development and protecting the ecological environment.

2.2. Bionic Design Concept

The core of bionic design is to design and make products by transforming the information obtained from a certain aspect of the organism's form, texture, structure and function into the solutions people need by using certain technical methods. [2] Bionic design is a scientific and theoretical concept, which provides rich materials as well as theoretical basis for packaging modelling design, and is an important source of inspiration for designers. Food packaging design using bionic design can bring people and things, people and nature, things and nature's proximity, to achieve a harmonious coexistence of man and nature. Bionic design of seafood packaging with artistic, personalised, emotional characteristics, to achieve a combination of nature, to meet the spiritual needs of people to return to nature.

In bionic design, there is biomimicry, which seeks to imitate the similarities based on the perception of the external form of natural organisms. Biomimetic texture, through the creation of biological surface texture and texture design, to enhance the functional significance and expressive power of biomimetic design products. Biomimicry structure, through the cognition of the structure characteristics of natural organisms from inside to outside, combined with different product concepts and design purposes for design innovation, so that artificial products have the meaning and aesthetic characteristics of natural life. Biomimicry function, study the objective function principle and characteristics of natural organisms, and get inspiration from them to promote the improvement of product function or the development of new

product function. Biomimetic colour, the colour of natural organisms is first of all the characteristics and needs of the existence of life, and it is the main content of natural beauty for design, and its rich and varied colour relationship and personality characteristics are of great significance to the colour design of products. Biomimicry imagery, biological imagery is produced in the process of human experience and emotional accumulation of understanding of nature, biomimicry imagery of the design of the product semantics and cultural characteristics of the embodiment has an important role. [3]

2.3. The Relationship between Green Design and Bionic Design

Designers are inspired by the natural world, the pursuit of organisms of the original form, function, colour, structure, etc., which comes from the concept of bionics, and then design to imitate the natural organisms which is not a green concept, such as green environmental protection packaging, the material is made of natural bamboo, grass fibre, wood, leaves, straw, etc., and these materials from the natural world will ultimately return to nature, and can be degraded directly into the mud and soil. It will not cause great harm to the environment, thus protecting the original ecology of the village in a friendly way. Biomimetic design is a design idea that aims at imitating the characteristics of living things in the natural environment in order to solve the practical problems encountered in similar situations. By simulating the natural environment, biomimetic design can spontaneously show its unique environmental protection concept, and biomimetic design naturally has the characteristics of green design.[4]

In the countryside seafood food packaging design green design and bionic design concept has a closer relationship, the structure of the packaging modelling bionic, simulating the sale of seafood raw materials, such as food is fish then the packaging form can be imitated in the form of fish, so that the packaging is more vivid image to attract consumers to buy, its packaging materials to be environmentally friendly, the use of biodegradable or recyclable materials, so that the environment is not contaminated, let people healthy and comfortable existence. The use of green bionic design concepts can not only help humans better understand nature, but also provide a more environmentally friendly way of life, so that humans can better adapt to the natural environment, so as to achieve a more efficient way of life.[5]

2.4. New Concepts in Green Bionic Design

Through the synthesis of green design and biomimetic design concepts, 'green biomimetic seafood packaging' is proposed, which refers to the packaging that pays attention to and draws on the form, function, structure and material composition of living organisms in the natural environment, and that is environmentally non-polluting from the processing of raw materials to the production of products, and that can be recovered and recycled, or recycling, and that can be dissolved by itself in nature. In the face of the fierce competition of the existing food packaging on the market, adding green bionic design can make our packaging design stand out in the market, this paper research for these existing problems to solve to provide innovative points for the local characteristics of the green bionic packaging to provide a design entry point to enhance the influence of Xunpu village's tourism and culture, so that the fishery, culture and tourism industry fusion, with their own unique image, so as to

promote the revitalisation of the countryside, and this model can be used to promote the development of the village. Rural revitalisation, and this model can be applied to fishing villages in various regions, widely used, is the research significance of this paper.

3. Seafood Packaging Design Cases

3.1. Canned Seafood Packaging

There is a wide variety of seafood packaging in the form of cans, Figure 1 Bedow, which is a smoked herring sauce from Biggans, a small family business that has been producing products for the Swedish market since 1952. Bedow's approach to the design is really dependent on the quality of the illustration and its implementation of the fish passing through the tubes and the fishing boat and the waves passing through the box, with a pleasing balance between line and negative space, detail and reduction are pleasingly balanced, with some lovely movement captured in the rendering of the waves, and a clear hand-drawn aesthetic that expresses a familiar but striking sense of craftsmanship, which is then applied to the box in a way that breaks down the panels and introduces visual textures and variations, whilst still embracing a sense of Scandinavian restraint. Figure 2 This is a canned seafood brand called Gold Fish, so the design is directly inspired by Pushkin's fairy tale The Tale of the Fisherman and the Goldfish through naming diffusion.[6] Figure 3 Eternal Oceans, sustainable fishing for the future Eternal Oceans promotes sustainably caught fish through disruptive and aspirational packaging design, the packaging design uses the pull-tail found on many cans and transforms it into a brand asset, the entire structure of the can represents a beautiful silver fish with a ring pull-tail, which is both iconic and functional, the brand is simply embossed onto the metal, giving the pack a pristine and premium look.



Figure 1. Bedow



Figure 2. canned goldfish



Figure 3. Eternal Oceans

3.2. Bagged Seafood Packaging

Seafood food packaging in the form of bag seals, Figure 4 Mr Flax, salmon hidden in a big beard, is packaged in a bag sealing method, which largely maintains the freshness of the seafood product, and the design of the beard resembles a fish tail, which is a clever use of bionic design.[7] Figure 5 Tanto Mar, the designer developed illustrations based on mosaics and representing animals and sea creatures. The packaging was developed not only on a graphic level, but also on a structural level with a new and more flexible triple pack approach. Figure 6 Fish&More, a clean design with hook-looking symbols in the logo, corporate motifs that resemble natural textures, illustrations, and colours that are fresh and sea-related. The Fish&More pack has large transparent windows through which buyers can view the fish in detail from all directions, emphasising the honesty and transparency embedded in the brand's DNA. The new structure of the Fish&More product line and thoughtful names 'Carefully Caught,' 'Carefully Cut,' and 'Perfectly Enhanced' make it easier for consumers to understand the fish and seafood options. Well-designed infographics also help with product selection, explaining the benefits of each product and how it is made. Excellent examples of seafood packaging are worth studying to learn from the experience and design seafood packaging that fits the countryside.



Figure 4. Mr Flax



Figure 5. Tanto Mar



Figure 6. Fish&More

3.3. Boxed Seafood Packaging

Seafood packaging in the form of a box, Figure 7 New Zealand fish products brand East Rock, the designers adopted the concept of Japanese fish tops, using black and white fish tops as the main visual, the colours used are red and bold, which is a metaphor for the brand's Italian origins, and the blue and white colours are to reflect the image of New Zealand's clean and beautiful oceans. Figure 8 seafood brand Hardy, in the production of smoked salmon, combining the German smoking process with the Portuguese treatment, the main visual design of the packaging through the fusion of the two aspects of the presentation of its concepts, distinctive and eye-catching typeface reflecting the aesthetics of the rich German flavour, rigorous and sharp as a knife like a fork in the salmon body, the fish illustration not only presents the product directly, there is also a small and ingenious brush strokes in the tip of the implied that the smoking process, and for different products can be replaced by different fish illustrations. The fish illustration not only presents the product directly, but also has a small ingenious brush stroke on the tip, suggesting the smoking process, which can be replaced by different fish illustrations for different products. Figure 9 Canned seafood brand Nord Stream,

cleverly used the principle of lenticular animation, the five food products in the product line, sardines, smoked shellfish, crab meat, octopus, squid, are presented in five different images of illustration and the main colours, and when you open the package, these sea creatures will immediately move, the design team hopes to use such an interactive method to build up heartfelt communication between the product and the consumer. The design team wanted to build a heartfelt communication between the product and the consumer through such an interactive approach. The case of boxed seafood packaging provides a lot of inspiration for the design of the latter, using the concept of bionics for design, combined with the greening of the materials, to make the countryside seafood food more competitive and popular in the market.



Figure 7. East Rock



Figure 8. Hardy



Figure 9. Nord Stream

4. Suggestions for the Application of Green Bionic Design in Seafood Packaging

Through the field visit and detailed research of Xunpu village, the analysis of different styles and design ideas of seafood food packaging, we have come up with the design suggestions of seafood food packaging in Xunpu village, in terms of packaging materials, using environmentally friendly, biodegradable and recyclable green materials, reusable design, designing simple, bionic packaging structure in line with the oceanic elements, which not only saves the cost to a certain extent, but also reduces the the impact of disposable packaging on the environment. This design is not only environmentally friendly, but also enhances the consumer's buying experience, making them more inclined to choose sustainable products.

In styling design, the structure of the form of colour imitation biochemistry, into the countryside of the marine culture, the introduction of marine life in packaging design, such as biomimetic oysters, shells, fish morphology and structure; packaging appearance to add waves, seaweed or fish and other elements, through the colour and pattern to convey the product's freshness and natural attributes, so that the buyer to experience the seafood products are freshly caught and fished sense. This not only creates visual consistency with the product itself, but also enhances consumers' perception of and trust in the product. Creativity and practicality, to achieve a balance, packaging design should focus on creativity and artistry, but also consider the practicality and economy. During the design process, a balance needs to be struck between the product's brand image, market demand and manufacturing costs to ensure that the design solution can be practically grounded and commercially successful. Going for design, production and landing based on this advice will greatly increase the sale of seafood food in Xunpu Village, thus promoting the development of the rural economy. Using the green bionic packaging design, Xunpu Village's seafood products will present a unique environmentally friendly image and high quality product connotation in the market. This not only helps to enhance the competitiveness and attractiveness of the brand, but also brings healthier and more environmentally friendly consumption choices to consumers.

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