The green design came into being under the problem of ecological environment

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Abstract: The contradiction between people and the ecological environment has become increasingly prominent. Human nature and social sciences including design have all been proposed for environmental protection. It focuses on the environmental attributes (removability, recyclability, maintainability, reusability, etc.) of the product throughout the product life cycle. As a design goal, the basic functions, service life, and quality of the product should be guaranteed while meeting environmental goals.

1. Green design background

Today's mankind is faced with such problems as rapid population growth, shortage of natural resources, and serious environmental pollution. Human development and utilization of natural resources in an unrestrained manner has caused a crisis in its own living environment. In addition to the destruction caused by industrial and agricultural production processes, the large amount of garbage that people produce in daily life also causes great damage to the ecological environment.

In the past few decades, the use of environmental technologies in the manufacturing process has made considerable progress, such as the use of appropriate technologies and cleaner production. Now people gradually realize the important role of design in environmental protection, and “green design” has become the focus of attention. Traditional product design theories and methods are based on human-centeredness, starting from satisfying people's needs and solving problems, while ignoring the consumption of resources and the impact on the environment in the production and use of subsequent products. Therefore, the theory and method of traditional product development and design must be reformed and innovated. The continuous emergence of new technologies, new energy sources and new technologies has opened up new prospects for the design of environmentally friendly products. Many product designers have made active explorations in this area. While striving to solve environmental problems, they have also created new and unique product images.

2. How to define green design

Green design is an international design trend that emerged in the late 1980s. Mainly for the sake of transporting contemporary environmental crisis, it is emphasized that technological products, regardless of their manufacture or use, should reduce the consumption of natural resources and energy as much as possible. In the design phase, environmental factors and pollution prevention measures should be incorporated into product design, and environmental performance should be taken as The product's design goals and starting point, and strive to minimize the impact of the product on the environment [1]. Sometimes it is hoped that products will be fully recovered when they are discarded, and will not burden the global environment. In simple terms, it is a design philosophy that is based on natural friendliness.

For industrial design, the core of green design is “3R”, ie, Reduce, Recycle, and Reuse, which not only reduce the consumption of substances and energy, but also reduce the emission of harmful substances. Parts can be conveniently recycled and recycled or reused [2].

Into the 21st century, green has become a new fashion, and the green revolution has swept the world. Since the "green theory" has not been proposed for a long time, the definition of green design has not yet been unified, but the basic meaning of each definition is generally the same:

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Green design technology refers to the comprehensive consideration of environmental impact and resource efficiency under the premise of guaranteeing product function, quality and cost. It is the product's entire life cycle from design, manufacture, and use to retirement, no environmental pollution or minimal environmental pollution. To meet the requirements of environmental protection, harmless to the ecological environment or minimal harm, save resources and energy, the highest utilization of resources, the lowest energy consumption design technology.

Green design, also known as ecological design, life cycle design, and macro environment design, is the integration of macro environmental factors, effective and sustainable use of resources, and prevention of pollution into the design system. It is important to design the environmental performance of human survival and development. The goal is to promote the orderly development of human society through design, and minimize the possible damage in development. It can be seen from the above that the basic meaning of green design is to use a systematic design method and consider the entire life cycle of the product so that the designed product not only satisfies the basic attributes, but also meets the environmental protection attributes.

3. Development of Green Design at Home and Abroad

Over the years, green design has received more and more attention. Every country has begun to adopt green design concepts in its design to protect us from destroying the increasingly serious Earth home. Green design has become a trend in product design development. Large-scale product recycling and clean energy development are used in product development and design.

Development of foreign green design. Many countries in the world have formulated policies and regulations related to green design to curb serious environmental pollution problems. Many foreign companies have also made a contribution to environmental protection by themselves; many large-scale design competitions have also included green design as the theme of the competition. Designers began to think about how to incorporate the core concept of green design into their own designs, using the simplest shapes [3]. Express the best use of results; use the most environmentally friendly materials to reduce the harm caused to the environment.

The development of domestic green design. Due to the weak economic foundation of our country, coupled with the large population and serious environmental damage, the issue of environmental protection has become the most important issue to be solved in the current development process. Due to the limitations in technology and management, many companies still regard the product's shape and function as the primary method of attracting consumers' attention. Therefore, compared to other developed countries, China's green design is still at an initial stage.

4. The Characteristics, Contents and Three Elements of Green Design

Green design is a system and system. In other words, it is not a single structure and isolated artistic phenomenon. The specific features are as follows:

Ecological design must adopt ecological materials, that is, its timber cannot cause any harm to the human body and the environment. It can be non-toxic, non-polluting, non-radioactive, and no-noise, which is conducive to environmental protection and human health.

The product design is aimed at improving the ecological environment and improving the quality of life. That is, the product not only does not harm human health, but it should be beneficial to human health. The product is multifunctional, such as antibacterial, deodorant, heat insulation, flame retardant, Temperature adjustment, humidity control, demagnetization, radiation, antistatic, and so on.

Purchase local production of design materials, reflecting the concept of the design of the country. Avoid using materials that release contaminants. The product packaging to a minimum [1].The main contents of green design include: material selection and management of green product design; product detachability design; product recyclability design.

Designers want to make the designed structure easy to disassemble, easy to maintain, and can be recycled after the product is scrapped. In addition, there is a cost analysis of green products, a green

product design database, and so on.

Green design refers to the product's impact on natural resources and the environment during the product life cycle. It incorporates elements such as demolition, recyclability, and reusability into all aspects of product design. While meeting environmental requirements, take into consideration the basic functions of the product. Implementing green design needs to meet the following three elements.

It is required that the product, its parts and its outer packaging be reused. This requires the designer to design the product in the process of modelling, the parts structure should be as simple as possible and standardized, so that the use of materials is not only less, saving resources, and because it is a standard part, it can also be Recycle and reuse. Manufacturers should try to extend the life of the product, rather than updating it very quickly.

It requires the use of less raw materials and energy inputs to achieve the intended production or consumption, and then pay attention to resource conservation and pollution reduction from the source.

5. How to achieve green design

The realization of green design is a summation of the three principles that make the new product's entire life cycle a green design. For these solutions that require detailed solutions, designers are required to focus their design on using a more concise, classic, and generous product modeling style to extend the product life as much as possible. The green design emphasizes minimizing unnecessary raw material consumption. The importance attached to the use of recycled materials has also had a major impact on the appearance of product designs.

The design of green materials mainly highlights the selection of materials for environmental protection, and uses more environmentally friendly, recyclable materials to avoid the use of materials that are toxic, hazardous, and radioactive.

At present, some companies that pay attention to environmental protection will use other means to balance this aspect. For example, plastic housings commonly found in electronic products, we can achieve a bright appearance after plastic molding by applying mirror treatment to plastic injection molds. It is not beauty, eliminating the need for surface treatment of spray paint and minimizing the impact on the environment.

Green structure design occupies a very important position in the green design, and has a direct bearing on the long life and recyclability of the product. In addition to meeting the basic requirements of common products, the main consideration of the green structure design is the ease of dismantlement and availability of the structure. Recyclability, so the product's green structure design should have the following simple elements:

Long-life design refers to the use of advanced design theories and tools based on the analysis of product functionality and economics. It is a product designed to meet the current and future market demand for a long period of time. It does not blindly extend the life cycle of the product, but uses theory and methods such as modular design, open design, repairable design, reconfigurable design, and technical prediction. Minimize product obsolescence and extend product life cycle. One of the more important is the modular design of the product, which is also the core content of the green design.

However, some products, on the other hand, maintain the function and constantly change the appearance of the product. This involves the key to modular design, that is, the division of modules. There are mainly two types of modules.

In order to ensure the interchangeability of modules in the modular design, emphasis should be placed on ensuring the standardization of interfaces.

The main purpose of modular design is to make products with as many kinds, specifications, performances, and functions as possible with as few as possible types and quantities of modules. The advantage of this modular design is that the user can get the products he needs through the matching of different modules to meet the individual requirements. The second is to facilitate the user to maintain or upgrade the product during use to achieve the purpose of prolonging the product

life and reducing the material resource consumption.

Use renewable resources to minimize waste of limited resources. For example, solar energy, wind energy, and other green energy sources are used in many cases.

Green manufacturing is a modern manufacturing model that comprehensively considers environmental impact and resource efficiency. The goal is to make products from the design, manufacturing, packaging, transportation, use, and end-of-life processes to the entire product life cycle, with minimal impact on the environment and the highest resource utilization rate. And make the economic and social benefits of the company coordinated and optimized.

6. The current implementation of green design problems

At present, designers generally lack awareness of environmental protection and blindly pursue the appearance and function of products, but they do not realize that the implementation of their design plans will have a major impact on the natural environment.

The slow pace of follow-up on environmental protection laws and regulations and the lack of improvement in their efforts do not play a supervisory role in manufacturing companies. As a result, some companies still go their own way and do not scruple on the environmental issues caused by manufacturing products. In addition, the waste recovery system is also not sound enough to cause the harmful substances to be discarded and pollute the environment [4].

For example, electric bicycles that we are now familiar with use electric power as a power source to reduce carbon emissions and save petroleum resources. However, if the unreasonable production or recycling of batteries results in high pollution, our waste recycling system and recycling technology level need to gradually improve.

In addition, the advent of the green era brings certain difficulties and challenges to design projects. For example, the use of new materials will inevitably face new processes. Therefore, how to ensure the quality and function of products has become a must for designers. For green design, I do not know how to integrate it into product development, but often rely on subjective imagination and original experience to carry out the development work.

In order to consider ecological design at the design stage, design engineers need not only electronic knowledge, but also extensive knowledge in materials science, structural design, chemistry, and the environment. This requires greater use of multidisciplinary collaborative design. , All kinds of problems mean that product design wants to achieve green design in a real sense, but also need more and better ways to assist designers, so as to achieve the protection of the environment.

7. Summary

In a sense, people are always accustomed to finding problems and then solving problems, and seldom to prevent problems from happening. To deal with the environment, we have to go ahead of the problem because once we destroy the environment, we cannot Back to the original, green design is a means, not an end. What people need more is to improve the awareness of the environment and to protect the environment.

At present, the green design concept has become the mainstream of product design. It actively advocates the harmonious coexistence of man and nature throughout the product life cycle. This is the time for adapting to the sustainable development of society and the development trend of future product design. Designers must not only use existing design methods, but also explore and develop as much as possible new energy sources and new designs that can be used, integrate these new energy sources and new designs into products, and make our products to be green.

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