

Application of Green Design Theory in Industrial Product Design

Jing Hu

Taishan University, Tai'an 271000, China

Abstract: With the constant development of our modern society, environmental protection has been gaining attention. While the green design theory is an important manifestation of this. Reducing the environmental impact of products and applying green design theory in industrial design should be carried out in a number of aspects, which can not only reflect the technology itself but also motivate consumers to develop a green consumption idea, so as to improve the value of industrial products. This article will start with the introduction of green design, and then analyze the necessity of applying green design theory in industrial design, and finally provide some solutions on how to apply green design theory in industrial design, which could be taken as a reference for related researchers.

Keywords: Green Design Theory; Industrial Product Design; Applying Solutions

Introduction

Industrial design is a brand-new concept incorporating science and technology with cultural awareness, which mainly highlights the content of industrial design. It is able to analyze the entire life cycle of a product, optimize each link and reduce the negative impacts on the environment. A reasonable application of green design theory in industrial design can effectively solve the contradictions between industrial development and environmental protection. Promoting the development of industries along with environmental protection could help lay a solid foundation for the social construction of our country.

I. Green design theory

(1) Content

In the design of products, the environmental impacts should be fully taken into consideration. Whether the product design has achieved the desired environmental benefits shall be required for the analysis of the product. Moreover, the production time and economic benefits should be identified as well. Practically speaking, it aims to reduce the environmental impacts while at the same time ensuring that the products could function well in the entire design process. Ecological benefits are considered in the designing process and environmental protection is regarded as a measurement for the design, which is also an important demonstration of the sustainable development of our country. Applying green design theory in industrial products needs to consider a balance of design from all aspects, develop a green awareness, and reduce energy consumption by adopting artificial methods. To reduce the negative environmental impact caused by material consumption during industrial production, we need to tackle the issue from the structural design, so as to improve the utilization of resources. To achieve this goal, we need to not only work on promotion but also fully consider the various technologies that are available in product design. We should try to use biodegradable and recycled materials rather than hazardous ones that are supposed to be strictly prohibited, so as to reduce the adverse impacts on the environment. Besides, we should take into consideration the fact that the product should be capable of being recycled and reusable during the product design, in order to ensure that the products can meet our practical needs.

(2) Features

First of all, green design is a brand-new design concept since the focus has been shifted from economic orientation to environmental protection. In this case, the nature of design has totally changed, which is not only demonstrated in the change of concept, but also in the varied meaning added to the product itself. Secondly, the design method has also been changed. Traditional design attaches more importance to the opinion of the public and considers their demands as the root of design, which could ensure consumer satisfaction but could pose a serious problem for the development of the entire society. Therefore, the green design which highlights environmental protection has reflected the current demands of our society. Finally, it is non-polluting. Currently, with the widespread application of the idea of sustainable development, the materials used in our industrial production should also transform from non-renewable and toxic to renewable and non-toxic ones. Reducing the use of non-renewable resources could better reflect the recyclability of industrial products.

II. The reason why applying green design theory in industrial product design

(1) The demands of social development

With the increasing acceleration of social construction and to ensure the sustainable development of our society, it is necessary to introduce advanced concepts, improve production technology, and find a development method that is in line with our national conditions, which is also an important foundation for the economic construction of our country. Whereas the application of green design theory in industrial product design could effectively reduce energy consumption and improve energy utilization. Hence, we can both achieve the goal of protecting the environment as well as reduce the waste of resources, so as to live in harmony with nature and meet the practical demands of social development.

(2) People's desire for better lives

With the improvement of people's living standards, their requirements for the quality of life have also been raised. Therefore, the application of green design is not only an eager desire of the public but also a key method to raise their quality of life. Applying green design theory can make the product more environmentally friendly, which in turn minimizes its adverse impacts on our health as well as serves and satisfies us better.

(3) The needs to protect the environment

In the process of social development, all areas need to be optimized to facilitate environmental protection. The application of green design theory in industrial products could truly meet this requirement. By reducing pollution and promoting environmental protection, it could address the pollution issues that frequently occur in industrial design. Thus, while promoting industrial development, we could protect our environment as well.

III. The technologies of green design adopted in the industrial product design

(1) Modular design

According to the nature and features of the product to be used, the product itself can be divided into different segments, each with its own features as well as different designs and production methods. Therefore, it is necessary to specify the production method according to their features before the production. Modular design can effectively reduce the waste of resources as well as the costs. Meanwhile, it will not be affected by equipment factors during the entire production process, thus production efficiency can be guaranteed. This is also a very common type of application in green designs. The mechanical equipment needed for modular design will be divided into different segments according to the specific features of the product. so, the machinery has some commonalities, that is, the ability to manufacture products with similar modules, which can not only improve the efficiency of the machinery but also reduce the costs. However, it should be noted that the machinery needs to be updated in time to ensure they can meet our requirements.

(2) Design for disassembly

This design is mainly used for machinery with a heavy weight that needs to be transported. A piece of machinery is

divided into different parts, and then each part is designed separately and assembled at last. The machinery needs to be disassembled according to the actual transportation demands and specific situations, so as to facilitate transportation. The disassembled design can not only facilitate the replacement of parts of machinery, which can save time, but also effectively avoid the problem of parts damage caused by improper transport.

(3) The design to extend the service life of products

This design mainly analyzes the life cycle of the machinery. Because factors such as performance and running time could reduce the service time of products, which will not only affect the production of a company but also result in increased costs. Whereas this design can help to improve the performance and extend the life cycle of machinery, so as to reduce the financial investment of companies. This technology is able to guarantee the stable performance of machinery and it can also control the working time of the machinery within a fixed period, so as to better extend the life cycle of the machinery. Moreover, enhancing the wear resistance and compression resistance of each part of the machinery to reduce their chance of damage, which can help companies reduce their costs.

IV. The application of green design theory in the industrial product design

(1) The design of industrial products with low energy consumption

With the huge energy consumption and shortage of supply in resources, it is necessary for companies to optimize their designs which can enhance energy efficiency, and increase the rational application of energy-saving technologies. Fundamentally speaking, designing a low-energy industrial product is a reflection of green design and also an important component of it. By the effective application of new technologies, energy consumption can be reduced, which could help promote the environmental friendliness of products. Therefore, it is imperative to highlight the energy consumption in the design of specific products. For example, the energy consumption of various types of home appliances such as air conditioners and refrigerators are relatively high in the summer. Therefore, the impact on energy consumption at a certain period of time should be fully considered when designing these products, and corresponding measures are needed to optimize it.

(2) The design of green packages

Green packages for industrial products refer to the design of the most reasonable packages which can help to preserve the environment and reduce the waste of resources during the design of packages. Based on the green design theory, the packages of industrial products should not only minimize the use but also reduce the waste of materials when fully reflecting the value of the product. Moreover, eco-friendly materials should also be used. Based on the non-toxic and degradable principles, disposable lunch boxes, for example, have been replaced by biodegradable ones gradually, which is a perfect embodiment of environmental conservation. In addition, when selecting materials, recyclable materials should be given priority, which can help to extend the life cycle of the packages of industrial products and reduce the environmental pollution caused by them.

(3) The design of green materials

Since materials are an important component in industrial products, their value also needs to be highlighted in the product design. Materials should be selected rationally so that environmental requirements can be met based on the desired objectives of the design. In terms of industrial design, we should reduce the use of materials with toxic substances, reasonably apply advanced materials and reduce the reliance on traditional heavy metals, plastics, and other materials, so as to meet the requirements of sustainable development.

(4) Design for recyclability

This paragraph focuses on the recycling of industrial materials as a way to achieve the recyclable use of products. The design itself shall not only reflect on the selection of materials, but also the disassembly of the product. Since disassembled industrial products can reduce costs and facilitate subsequent product recycling. Therefore, in the design of products, it is necessary to rationalize the structure of industrial products, select materials with better compatibility, and reduce material consumption. In addition, the fastening method of the product shall also be highlighted to reduce the use of fastening parts

and ensure the safe and efficient disassembling of the product. Finally, it is necessary to analyze the separability of the various parts of the product to ensure that they can be more easily recycled.

(5) Life cycle design of products

The design of industrial products must be able to fully meet the current market demands for development, so its production cycle should be taken into consideration. We need to reflect on the awareness of environmental protection on the basis of ensuring quality to drive forward the development of society. For example, cars have been updating rapidly, and the life cycle of a car is generally ten years. But in terms of green design, the longer the life cycle of a car, the less pollution it can cause to the environment. Therefore, we should try to extend the service life of a car on the basis of ensuring its safety, so as to reduce the waste of resources and improve the protection of our environment. The relevant designers need to consider the various factors affecting the life cycle of the product during their design and to optimize it based on each factor so that the value of the product can be increased while ensuring its safety.

Conclusion

Overall, the emergence of the green design is to cater to the sustainable development of our country, which has great potential for development because it is in line with our social construction. During industrial design, relevant designers should not only fully understand the green design itself, but also be able to design industrial products that better meet our practical needs by taking advantage of their own professional knowledge. To achieve the goal of the green design, we should also ensure that the materials selected are environmentally friendly so that we can better protect our environment and achieve sustainable development, which helps to lay a good foundation for the construction of our society and promote the steady development of our society towards a more rewarding way.

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