Sustainability of green product design teaching and research

Ren Chengyuan[1] Cai Chen[1]

[1]Tianjin Polytechnic University, TianJin, China

Abstract

To set up the Economy-Type Society, advocate a Green Life, from economic to personal lifestyles or consumption habits change, promotion of sustainable development. By studying the relationship between people, products, environments, these green living product design concept and method, to create a low-carbon life, develop low-carbon economy, green consumption, conserve resources and enhance the design values for information.

Keywords: Green living; Sustainable design; Low-carbon life; The value of design

1. Introduction

Setting the Economy-Type Society is mean to mobilize and motivate the whole society to save and efficient use of resources by means of improving the mechanism, adjusting structure, advancing technology, strengthening management and advertising education in the production, circulation and consumption of social reproduction, supporting the whole social welfare level of the sustainable social development model in as little as possible of high resource consumption[1]. The current green life has swept across all over the world, it is moving from the world's advanced industrial countries towards developing countries, including green travel, green consumption and green production. To set up the Economy-Type Society, the designers should make efforts to promote the economic sustainable development and build a green home in the guidance of green living design concept.

2、Green life product design concept

As an link of production and life, the product is responsible for the current ecological environment problems the human faced. Product production process, the use of the product and post-processing process constitute a product system in the condition of viewing the product as the core. Traditional product design theory and method is human-centered, starting with meeting the needs of people and solving the problem, ignoring product follow-up, the consumption of resources and energy during use and emissions to the environment. Therefore, it is necessary to reform and innovate the design theories and methods of traditional product development and research the concept of green product design life. Some countries and regions have already taken green concept as an important part of international competitive strategy at present.

The starting point of the idea of green life product design is focus on the influence of product to natural resources and environment, putting the elements like demount, recycle, reuse in the every link of product design. While meeting the requirement of environment, the product design should take the basic function, service life, economy and quality of product into consideration. The design concept starts from transferring energy, creating energy, saving energy, paying attention to the unity of human and nature.

3、Green life product design method

3.1 The design concept of creating energy and transferring energy

There are lots of resources in nature, such as solar energy, wind energy, tidal energy, etc; The biological itself also will release energy, like the growth of plant, the animal's back to their nest, the exercise of human, etc ; The synthetic fuels such as mechanical energy, chemical energy , electric energy, etc. For achieving the aim of emission reduction and low carbon, we should strengthen technology innovation, create energy or get the transformation of energy in the use of energy sources.

The author guided the students to design solar charging stations, catering to today's science and technology electronic era. The digital products like MP3, phone and handheld computer, even completely become a necessary for most people, these products all need electric energy. In addition to the users are human, the activity of power and abundance of electric energy are the key point of product. Solar charging stations have line feeling design, filling with fashion, each line connected as a whole without interruption, and this is for the connection of the internal circuit wiring. The ceiling of the station installed solar panel , under the solar panel is seats for relaxing, and the seat is integrated with the whole station. There are charging plugs with two or three holes and USB placed at the front and back of the seats. The device can charge the digital products, such as electrocar, phone and computer, etc. The solar panels stored much electric, it can charge many devices at the same time when the pedestrian have a break or wait for cars.

Fig.1: the design of solar charging stations

The key to creating thinking is to catch the essence of object. We should observe carefully and find the problem during the life, making pointed references to design[2]. For example, the wind comes with the underground when you are in the underground station, the wind can be a design idea at that time, can you transform wind energy into electric energy during daily life? For another example, you will release much energy when you do a sport. These are all creating energy, like shaking on the rocking chair and do other exercise. You can use creating energy and transforming energy synthetically to make your idea richly. But you'd better not transform energy passively, like the hand power generation, it is not a fully artful idea. People may not use it because you can't get electricity without hands, this is the imposed and passive way to transform energy. The designer Novague from Prague design studio designed Spontaneous electrical rocking chair, under which was equipped with a dynamo, the dynamo can produce electricity and storage electricity with the shaking of chair, it can be provided for a book light on the chair to light up your field of vision.

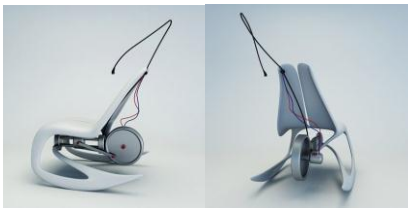

Fig.2: the design of spontaneous electrical rocking chair

For example, we can use the frequency and gravity of stamping on the floor to storage electricity. The theory is that the same poles are mutually exclusive and the opposite poles attract each other between the magnets, so that the square in the middle of the floor can present the state of maglev. The lines of force can incise the coil to produce electricity through jammed on the permanent magnet. The power floor can be used to the crowded place, such as zebra crossing and the walking street. The electricity stored can be used to the auxiliary facilities in the streets.

3.2 Energy-saving design concept

Because the exceedingly exploit and use of the Earth's natural resources, the various kinds of resources crisis occurred, this lead to a new lifestyle for saving and environmental protection came into being[3]. The attitude is the key to green life for ordinary people, we should pay attention to save electricity, water and oil. The first step of setting the Economy-Type Society is saving, we should realize we are a part of nature system and have special initiative, playing initiative to design can change the life. For example, water is a precious resource, to storage the rainwater in the numerous rainfall places and use to watering or service for life; The public seats can be designed to a form to collect rainwater, and then applied to plants watering, cars washing and cleaning facilities, etc. Combining the practical function of seats with saving water to reach the aim of energy saving.

The "nature- human- society "system is evolved in the media of nature system[4]. Human beings should love nature, respect nature and cherish nature, pursuing a efficient and concise lifestyle, using the least social cost to achieve the maximized social and personal earnings. With the high development of society, human's life, working and various kinds of environment present a tense and fast rhythm, more and more family pursue the comfort of backing to nature after work, to get the aim of adjusting mentality and allaying tiredness. People like pursuing the form of natural elements. The application of natural form and bionic form are a inevitable trend of human backing and human presentation[5]. With the popularity green consumption, people pursue natural materials, such as paper, cloth, and wood, etc, expressing plain, nature and reality. People like the leisurely, easy and comfortable life experience of countryside. Therefore, the design must highlight the core of nature.

（1）Green life product design concept

For the purpose of saving resource and protecting environment, the concept emphasize protecting natural ecology, full use of resource and kind to environment. The first step of the concept is the choice of green material.

Green material is based on the requirement of realizing the function of product and has good environment compatibility. Green material has the maximum resource utilization and the minimum environment impact during the every lifecycle of making, using and disposing after use. You'd better to choose environmental material when you design products, or not to waste and make the material reproducible and recyclable, choosing low-energy and less pollution material. Using bamboo material to make the enclosure of phone and laptop. Bamboo material is a very rare natural green material, comparing with wood material of long growth cycle. Bamboo has the characters of short lifecycle, fast growing and convenient recycle, it is worth using due to the present state of environmental degradation and lacking wood.

Fig.3: the application of bamboo in product design

（2）The design concept of recycling

It is a design highlight to use rebirth products like the packing of waste material and other waste material. The teacher guided students to use ring-pull can to make a horologe product in picture 4. Catching formative isomorphism in the design process is important, the thought must be active. The single model product may hard to satisfied the recycle of product in the aspect of visual effects, space and force, you can make more waste product combine at that time. The recycle design of yogurt containers turning into lamps in picture 5 and beverage cans turning into spray bottle in picture 6.

Fig.5: the recycle use of beverage cans

Fig.6: the recycle use of yogurt containers

Fig.7: the recycle use of spray bottle

（3）Modularized design concept

The product modularized design is that making the product divided into several parts and every part has independent function, has same geometrical connecting interfaces and uniform input and output port unit, the same kinds of models can be reused and interchanged , and the related models permutation and combination can made into the final product. We may create products in different requirements through model's combination. The modularized design methods make products relative functional independence, the parts can be only changed when they damaged or life ended without affecting other functions in the whole product. The travel bag the writer designed also used the modularized design concept in picture 7, the travel bag is made up of two single store spaces, and they can be split or superposed for convenient use.

Fig.7: the design of travel bag

4. Conclusion

Green life refers to human future strategy choice, changing from state politics, economy and personal lifestyle or consumption custom, it has big significance in building a conservation-minded society and promoting the sustaina-

ble development of economy. The design play an important role in using scientific and technological achievements to design products[6]. The designers should think over how to view design as media in the elements of present society, culture and environment, to make the world long-term survival and create a better life.

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