



## The Relations between Products Design and the Space Environment

Wenjing Ren

Tianjin Polytechnic University, Tianjin 300160, China

E-mail: rwj209@yahoo.com.cn

### Abstract

The products have merged the plural culture in the world organically, which built out the space environment with the characteristic of different regions and different design styles, thus make the products satisfy different spiritual purposes as much as possible and reach the sympathetic response of the spiritual level. To the consideration of the relation of the product and its space environment, that is to meet the demand of human oneself. As a specific sense of "the space environment", the product is subordinated to the space environment and has extremely close "symbiotic, coexistence" relationship with space environment, in the modern society, the product design has played important role to the formation and development of the space environment.

**Keywords:** Product design, Space environment, Relations

People are living in a certain space environment, various space environments, including natural and social environment, all of them have a major impact on human life. The scope of environment is enormous, and all artificial things that are formed is the factors of the space environment. In modern society, product design has played an important role to the formation and development of the space environment.

For many years, the definition of excellent product design is that the performance is outstanding, the usage function is fine, the production process is simple as well as the safe and pleasant appearance, the relative importance of these criterions has some differences because of the product diversity. The definition of new excellent product design will include the consideration of the space environmental factor.

Then what is the product design? The product design is a shape activity that people take industrial products as main object for the survival and development; it is the important field of pursuing function and the value of use, it also is the medium of people and nature.

The Japanese Chuan made a vivid description in his book "what is the product design": "The mankind places oneself in the nature, there have produced two kinds of contradictions in the process of gradually breaking away from the natural. The first kind of contradiction is that mankind doesn't care oneself is a member of the nature, and bravely challenges the nature; The second kind of contradiction lies in that the mankind was born solitarily, and also died solitarily, but a person can't survive alone. In order to overcome the first kind of contradiction, the mankind created tool; In order to solve the second kind of contradiction, the mankind invented language". This section is just the abundant expression of the meaning of "Design": The mankind designed various products in the world of tool for the sake of the relation of contacting person and the nature; The mankind created mark, symbol in the communicant world for the sake of coupling interpersonal relation; In order to mediate the relation between human society and nature, and make it prone to equilibrium, then the space environmental design appeared. Among them, there are very close relations in the product and space environment.

### 1. The space environmental design is the important component in the knowledge system of product design

The science of product design was constructed synthetically by the knowledge system of various fields such as nature, humanity and psychology, etc. Among them, man-machine engineering, mechanical engineering, design methodology, the material and processing technology, design psychology is being applied extensively. Now I briefly introduce the study content of some correlated curriculum.

#### 1.1 The man-machine engineering

The research contents and range of application of man-machine engineering is extensive, but the basic research direction of this discipline is to insure optimization of overall performance of the man - machine - environment system by opening out the regulation of interrelations among the man-machine-environment. As regarding product design, it also surrounds the basic research direction of man-machine engineering to make sure a concrete research contents, and

it is the important content of man-machine engineering to research the relation between the product and surrounding environment.

### *1.2 Design methodology*

The problem that should be solved first in the methodology of industry design is the combination of technology and art. In the process of the combination of technology and art, design science became "soften", and art has got the materialization, just in the middle of this, the product design has been developed. And the second basic problem of the study of design methodology is correctly handling the relation between function and form. Product design doesn't only research the relation of man-machine, and should expand to artificial environment of the whole human. Paying close attention to the harmony of human society and living environment on the whole is the main trend of the development of product design. So the third basic problem of the methodology of industry design is to study the relation between macroscopic and microcosmic. We can understand that one of the important research contents of design methodology is research the artificial environment of the products.

### *1.3 Material and processing technology*

Through studying to this course, we can know that people received experiential understanding from material performance, craft and use characteristic over a long time, it changes to research the fundamental science from internal structure of material. Our science consciousness of the material changes to practical application of the material in social production and living. And these happen to show that design has become the tie that meets the needs of society through the technological means. In the process of product design, applying correctly to the material also involves the relation between products and surrounding environment, for example in the environment with moist dark, the material characteristic of the product should be able to bear tide and anticorrosion etc..

### *1.4 The space environmental design*

The space environmental design is the design that bases on the whole society and the mankind and takes the nature space as the centre, also call space design, it is the material medium between nature and the society. Because the "space" range of the space design is too great, should be limited in a certain range, i.e. the place where the mankind can survive and live. This place must possess the requirement that the mankind survive, and fully meet the need of human life. Space environmental design regards living space as object to come on. The products are essential material condition in the living space, the research of space environmental design facilitate the understanding of the relation between product and space environment, thus set up the thought of system design.

It can be found out from the disciplines above enumerated, the study on space environment around the products is the important research contents of these disciplines. The space environmental design is the important component of the knowledge system of products design.

## **2. The product is a kind of particular meaning of "the space environment"**

It should have a correct and overall understanding to the concept of the environment at first to understand the space environmental factor in product design correctly. So-called environment is surrounding everything experienced and felt by us, it includes the sum total of various nature, artificial factor or function that closely-related with human and influence the survival and development of human. That is to say, the environment not only includes the combination of various natural main factors but also includes the combination of different ecological relations formed by the interaction of person and its activity and natural main factor. Regarding the living environment of human that can be divided into two major types: I.e. material environment and social environment.

So-called material environment is the environment formed by various material factors; it can be divided into two kinds: natural environment and artificial environment.

The natural environment is the sum total of various natural factors in the nature, for instance mountains and rivers, lakes and seas, atmosphere, biosphere, lithosphere, etc.. It is the natural environment that offers the most basic material condition for the existence and development of human. The artificial environment is the living environment of human that is formed by the mankind utilizes and transforms the natural environment, it includes the material civilized world that mankind touch and design. The range of the artificial environment is extremely enormous, all artificial things are the factor of the artificial environment, even as big as city, building, or as small as various industrial products and physical factors such as sound, light, heat, etc. that constitute indoor space. In the modern society, the product design has important effect on forming and developing the artificial environment, and product is a kind of factor that constitutes artificial environment, it's also a kind of "space".

## **3. The product and space environment exist the very close relation of "symbiosis, coexistence"**

It should know the relevant factors that product exists at first to understand the relation between the product and its space environment. The factors related to product mainly reflect in three aspects: user, environment for use and existing society.

### 3.1 User

The relation between products and user mainly reflects in three aspects. First of all, the closest relation is the man-machine relation. Man-machine relation is the core of product design, why the products form, how is the state and how value behavior is, all of these make concrete appraisal around man-machine relation, design behavior also naturally get back to these basic point, i.e.: the symbol behavior, the contact behavior, dimension behavior, the range behavior, the manner behavior, operation behavior. How to better solve the man-machine relation for guiding the product design, in the knowledge system of product design, mainly applied to man-machine engineering. Secondly, the relation between product and user also reflects in the purchasing power of the user, this will require correct localization to the products that are designed, and develop the corresponding products to different consumption crowds. Finally, consumers' taste is a factor of guiding product design too, this demands that design should have original creation and leading side, and also be accepted by the user of today.

### 3.2 Environment for use

The relation between product and using environment reflects at peripheral product on one hand. People usually not only use a kind of product to finish a certain behavior in daily life, it is also very important to coordinate the relation between the products well to the design of product; The relation between product and environment for use also reflects on the space that is used, the size of the space will influence the use of the products too, so according to different space requirement, the design of product will have certain restriction; The environmental state around the products is also a respect of the relation between products and environment for use, physical environment such as the noise, illumination, humidity, temperature, atmospheric pressure, dust, radiation, force field, magnetic field, etc. are restricting almost all the respects of product design seriously, there are also structure, shape, material, craft, function, operation, etc.. There are some products such as the warm kettle, the design of travel type and household type are different, though their final function are all used for holding water, the former have to be portable besides holding water, but this problem does not exist in the household type, so long as it is convenient to take and fetch. For another example the design of the clock, wall clock, desk-top clock, floor desk clock, wrist-watch, because the use environment of them is different, its form of design has a very great difference. Every kind of product has environment in conformity with it to exist, while carrying on the product design, we should design the products according to the particular environment where the products exist in. The products should also reflect the characteristic of the surrounding environment to a certain extent, thus can combine with the surrounding environment harmoniously.

### 3.3 Existing society

The behavior of the social attribute of product in the whole development of human society in the future will be more and more distinct. The products that are from forming to giving play to the role of function are influenced and determined by every factor in the society constitute, politics, economy, folk custom, art, science and technology, religion, humanity, every factor of them refracts all sorts of phenomena out in the stage of society all the time, such as putting out different idea direction and main rule of constitute to composition and regeneration of the artificial thing, the low exhaust mini-car under the leading factor of the social ecological view, the new dynamical solar cell, research and development the fuel of hydrogen for family cars, etc.. As long as there is existence of the society and then will have a cultural phenomenon, the spirit of humanity performance that permeates out from every material of the society. The product is the outcome of the development of social humanity, each product also reflect the new contribution of the cultural development of mankind at the time of symbolizing new technique means that bring benefit to mankind. In the product design, the social humane factor is acting on localization and development of the products from the soft side constantly, and pays close attention to the developmental tendency of each cultural mainstream of the society, the important content which the product design reveals the competitiveness is to turn the cultural consciousness of conception into the means of design behavior in time. The ones that influenced product design directly in the view of social humanity are as follows, social aesthetic, product function value, regional folkways and customs, culture background cognition, etc., they constitute main contents that product humanity display. In addition, there are close relations between questions and product design such as social regulation, taboo, public hazards, etc.

We can know from above, design should be limited by certain condition, it is not the beauty pursued by designer's subjective judgment, and design will be limited by user and environment for use, will be limited by the market and selling mechanism. The product can not get away from the environment where it exists and the environment is the condition that the product depends on. Product also reflects the era characteristic of the space environment and the living level of people. The products have merged the plural culture in the world organically, which built out the space environment with the characteristic of different regions and different design styles, thus make the products satisfy different spiritual purposes as much as possible and reach the sympathetic response of the spiritual level. To the consideration of the relation of the product and its space environment, that is to meet the demand of human oneself. Therefore we can know that the products subordinate to space environment and exist the very close relation of "symbiosis, coexistence" with it.

#### 4. Our products should be designed with space environmental awareness

The products serve the people and take "people" as the center of a circle to launch, however, product design not only needs to consider people, but also consider the space environment that people locate. The definition of lately outstanding product design will include the consideration of the environment.

The design activity of mankind not only created the mankind's material environment but also constituted visually cultural landscape of human life. So the space consciousness in the design should also include from people's physiological and psychological need to set out, and in view of different culture background of society, design aesthetical factors of vision meticulously such as the color, shape, material in the space, etc., should avoid the pollution of design, create the beautiful living environment of human with coordination. The coordination of the visual factor included the coordination between the artificial things and surrounding environment on the vision, also include the coordination of different visual elements in artificial environment. While carrying on the product design, it should not only coordinate with the natural environment on the ecology, but also obtain tacit understanding with nature on the vision, and try hard to avoid the destruction to nature with forming the relation of "symbiosis" with nature. The organic building that was designed by Wright who is a famous designer in U.S.A. is the model in this respect. His organic building is "the natural building", the nature is the organic whole, the designers should get enlightenment from the nature, house should like plant, is "a basically harmonious key element at the ground, subordinate to the natural environment, grow out from the field, in face of the sun." The flowing water villa that Wright designed reflects the ideal of the organic building, it stands on the flowing water merrily and lightheartedly, the platform stretches into the surrounding space unevenly, size and material contrast finely with topography, wood, mountain stone and flowing water, building and nature are melted as an organic whole.

Any product design has its particular using space, so while carrying on the product design, we must consider the relation between the overall environment around and the product in such aspects as function, shape, color etc. fully, make design meet the requirement in use and style of the overall environment, and willing to be the supporting role, can't be distracting. If a certain product is merged in the whole space, become an inalienable part in space, and then this product design is "admitted" at least. In a sense, the space environmental awareness is to overcome the desire of self-expression but give attention to both the whole and the overall situation. Moreover, in many production and living environment, a lot of products form the product system because of the relation of using function, such as the series of electrical home appliance in the integrated kitchen and the series of modern official working instrument that is used in the office, etc. While carrying on the design of this kind of product, we should consider their intercommunity on the shape style and the coordination relation in space dimension, make the same series of products can constitute harmonious, unified function and visual environment but be unlikely to produce conflict. If we lack this kind of space environmental awareness, emphasize the full play of individual character and creativity unboundedly, then there may produce chaotic situation. Ronny who is a designer put forward, the design of any single-item product must all be incorporated in the integrated environment with unified style, otherwise the thought that designers wanted to express will have all gone in the conflict of the element.

The space environmental awareness of the designer still embodies in obtaining the biggest using value with the cost of resource as small as possible, and making the pollution of produces reduce to lowest in the process of production, use and recycling, then attain to make the product possess competitive ability in market, and friendly to the space environment.

#### 5. Summary

The space environment that the products exist in has very important influence on product design, the use environment of the product while loading and containing product also restricting and guiding it. How to hold the trend of product design on the whole in the complicated cultural world of design, find out "the position" of product in the space environment in various restriction is obviously the designer's important subject. This require designer must keep sensitive, distinguish his position in the nature and society constantly, and coordinate people, product with society, nature among corresponding level and relation (including the material level and culture level), Such products will coordinate and have vitality with space environment all the time.

#### References

- Cheng, Nenglin. (1999). *The General Outline of Industry Design*. Mechanical Industry Publishing House.
- Jane, Shaoquan. (2000). *Industrial Design Methodology*. Beijing Science and Engineering University Publishing House.
- Zhang, Tong. (2004). *The Product System Design*. Shanghai People Art Publishing House.
- Cheng, Hu. (2005). Discussing The Building and Environment. *The Building of Anhui*. 20 February 2005.