Environmental Landscape Design Based on Ergonomics

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Abstract

Ergonomics is a new discipline, mainly studying the relationship between people and the environment. In the modern era, people are more and more demanding of comfort and more and more rigorous pursuit of the spirit, landscape design change is particularly important. This paper first elaborates on the definition and concept of ergonomics, and then puts forward the important position of ergonomics in landscape design and analyzes the aspects of color, lighting and facilities in detail. In ergonomics can make extensive use of these issues to think, explore, research and then to solve, so that people can have a reasonable and comfortable living environment.

Keywords: Ergonomics, Color, Lighting, Shared design, Somatosensory interaction.

1. INTRODUCTION

Ergonomics is a new discipline that integrates many disciplines, including anthropometry, human mechanics and labor psychology. It has the characteristics of strong implementation and comprehensiveness. Used to study the interaction between people and other elements around, using the relevant theory and data to design, and strive to be able to combine the characteristics of materials and human comfort (Xie and Tu, 2011). "Ergonomics" There are many other nicknames, such as 'ergonomics', 'human engineering', 'human engineering' and so on International Engineering Society to give it the definition of: the researchers in a work environment In the anatomy, physiology and psychology and other factors, the interaction of people and machines and the environment. Investigate issues such as how you think about your work, your life, and your vacation, your health, safety and comfort. Before beginning to use the scientific name "ergonomics", the name has not been unified, has been deeply influenced by other genres. Some of the "ergonomics", sometimes called "ergonomics," others called "engineering psychology," and so on eventually led to the study of the relationship between the "man-machine-environment" environment designer The need for these relevant information, it is only cited "ergonomics" the name.

2. ERGONOMICS

2.1 Ergonomics concept

The main contents of "ergonomics", including "man-machine-environment", of which "people-oriented" is the core, only according to the characteristics of people, like to design and improve the system, but also need people to take action In order to ensure the operation of the system as "safe, advanced and comfortable." Human-machine-environment system, also called "man-machine system", interacts with each other and interacts with each other, Dominate the machine, the machine is the general term for the machine, including machinery and equipment, tools and facilities, instrumentation, etc (PullarandTidey, 2001). Environment refers to the environment in which people conduct these studies, the three are mutually integrated, indispensable (Zeng and Dai, 2011; Yu et al., 2010).
2.2 Ergonomic development

Modern ergonomics has gradually formed a relatively complete system, which takes people, machines and environment as a whole to be the object of study, to create a working environment suitable for human operation, to enhance efficiency and to make the three well-coordinated together, improve overall skills (Russell and Hannon, 2012; Xu, 2011).

The first International Ergonomics Conference in 1961 was held in Stockholm. The formal establishment of the IEA at the conference, which is the International Society for Ergonomics, led to the establishment of this Society, which indicates that ergonomics has become more and more important in all fields and has caused the experts and scholars from all countries attach great importance to IEA has been established, nearly 20 chapters, 30 countries have specialized research departments, held every three years an international symposium to exchange and study ergonomics in different periods of different fields can get different results and research direction, which is conducive to ergonomics faster and better forward all-round development. But in our country, due to national conditions and historical reasons, ergonomics started relatively late, early However, with the development of science and technology since the 1970s, the ergonomics of our country began to develop rapidly. In 1980, the China Machinery Federation formed a standardized technical committee. In 1989, China Human Efficacy Learn, many scientists and scholars have made a significant contribution to the development of ergonomics (Pallot et al., 2011).

3. LANDSCAPE DESIGN COMPONENT

3.1 Application of Ergonomics in Color Design of Landscape Environment

Color is one of the basic attributes of material. In the landscape design, we should follow the environmental attributes of colors in the rational layout and collocation of these colors so as to make the color most suitable for the entire landscape environment, pleasing to the eye, conforming to people's aesthetic and eliminating visual fatigue. Colors generally have the following environmental attributes:

Table 1. Place color temperature feeling

<table>
<thead>
<tr>
<th>Name</th>
<th>Illumination</th>
<th>Color temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>cold</td>
</tr>
<tr>
<td>Street lighting</td>
<td>3-23</td>
<td>2900-7000</td>
</tr>
<tr>
<td>Living, office lighting</td>
<td>50-170</td>
<td>4600-7000</td>
</tr>
<tr>
<td>Commercial lighting</td>
<td>40-2000</td>
<td>None</td>
</tr>
</tbody>
</table>
1) Comfortable. Color comfort and sense of fatigue is actually stimulated by color produced by the physiological and psychological comprehensive response. For example, red is the most irritating, easy-to-be-exciting and fatigue-prone, and green is the most comfortable color in your vision to help eliminate fatigue. 2) Warm and cold color. Different colors will produce different temperature sense. Red, orange, yellow gives a warm feeling. Blue and purple gives a cold feeling (Poirson et al., 2013). 3) Forward color and back color. For example, the colors of red, orange and yellow are warm and have the feeling of expansion and imminence. They are called "forward color". on the contrary, such colors as green, purple and purple are”. 4) Light weight. Color sense of severity depends on the brightness, cleverness, and color sense of light, low lightness color feel heavy. White objects floating, black objects heavy. 5) Soft and hard feeling. Color soft and hard feel depends on the brightness and purity. 6) A sense of lightness and depression. Bright and gloomy colors are mainly related to lightness and purity. Bright, bright colors have a bright, dark, cloudy color with a sense of depression. 7) Gorgeous and simple sense. Color gorgeous and simple sense and hue the largest, followed by light weight and depression. For example, red, yellow and other warm colors and bright colors with a gorgeous sense of beauty. Blue and other cool colors and dark colors with a sense of simplicity.

In order to optimize and create a good landscape environment, science should be selected and collocated with colors to avoid visual fatigue, tension or misrepresentation caused by poor color environment so as to create benefits for physical and mental health, life convenience, convenience for learning and work, Cultivate the sentimental landscape environment.

3.2 Application of Ergonomics in Landscape Lighting Design

Outdoor landscape lighting is the use of lighting technology to reproduce the outdoor landscape or secondary shape, to create a pleasant, beautiful and natural atmosphere, so as to enrich the cultural life of residents, giving the United States to enjoy (Mao et al., 2015).

Different landscape lighting will give people life, learning, work have different effects. Light is too strong or too weak are not conducive to vision, and easily lead to fatigue and irritability. Different environments require different types of lighting effects, require different lighting methods. In landscape lighting design, not only to create a comfortable, pleasant atmosphere, but also different regions to create a pleasant, intimate, gorgeous, dark, floating atmosphere. It is necessary to ensure that the light and shade of colorful, but also to avoid glare and other light pollution, so as not to cause harm to the human eye, affecting people’s normal rest and work (Loftness and Snyder, 2012).

3.3 Application of Ergonomics in Landscape Design

In the landscape logo design process should pay attention to the following points:

1) Landscape logo to be clear before the design of the location to be placed. It is important that landscape signposts place it before its design because human visual perception is limited. Not all environmental factors can cause nervous excitement. To put it in a nutshell, the logo should be within the visual range of people. In a suitable position, novel and unique style and can quickly attract the attention of the eye, and effectively convey information is the basis for the design of urban landscape logo modeling. 2) The form of logo should be novel, chic, and full of change. Novelty refers to the unusual form of identification, which is the most important cause for attention. Psychologists find that new, inconsistent graphics are more likely to cause people to feel more like other graphics, while moderately complex graphics tend to make people feel more easily, while overly simple or complicated graphics are just the opposite. The new and changing parts of the environment tend to be the centers of our attention, while the mediocre and clutter of monotonous ones tends to be the backdrop in the landscape. 3) The strength of the environmental form. Mass, colorful, bright or rough texture, loud elements, are easy to cause people's feelings. Of course, the strength of the environmental form can only be relative, it is not an absolute concept, are compared with other environmental factors around. 4) The elements of exercise. For example, the design of traffic signs should consider the movement characteristics of the target population. When designing the logo, it is necessary to consider the influence of such factors as speed, angle of view and weather, and whether the information can be delivered quickly, effectively and accurately (Wilson et al., 2015).

3.4 Application of Ergonomics in Landscape Facilities Design
Landscape facilities refer to landscape furniture and landscape decorative functional elements as landscape elements. For example: bus stop kiosks, kiosks, leisure seats, outdoor billboards, sculptures and sketches and so on. The contents of ergonomics research and its role in the design of landscape facilities can be summarized as follows: 1) Human body scale parameters are provided for the objects used in landscape facility design. Ergonomics research, for the landscape design facilities to fully consider "human factors" provides the human body structure scale, human physiological scale and human psychological scale and other data. These data can be effectively applied to the design of facilities. 2) Provide the scientific basis for the functional rationality of the landscape facilities themselves. In the design of landscape facilities, if you do not consider the ergonomic needs, it will be the failure of creative activities. Therefore, how to solve the optimization of various functions related to people in the "product" and create a "product" that is in harmony with the physiological and psychological functions of people will be an important issue in the functional design of landscape facilities.

![Figure 2. System operation flow chart](image)

4. ACCESSIBILITY AND SHARED ENVIRONMENT DESIGN IN LANDSCAPE

Barrier-free design refers to the design of products, buildings, and the environment that are safe and accessible to special populations. Shared design is the highest development of ergonomics "people-centered" design concept, development and improvement of barrier-free design, which includes the care of disadvantaged groups by barrier-free design, while making up for the weak design of accessible design. The lack of separation of groups from the general public. It considers both environmental (broad) barriers to elimination and offers special groups access to it, as well as convenience for well-being. Common design generally follows the following principles:

![Figure 3. Virtual Reality Human-Computer Interaction System](image)
1) Fair use. 2) Flexible and flexible use. 3) Simple operation, easy to understand information. 4) Easy to obtain information. 5) Good tolerance. 6) More labor-saving. Ergonomics focuses on human-machine-environment relationships and aims to design and optimize tasks, jobs, products, environments and systems to meet people's needs, abilities and constraints.

![Figure 4. Model creation flow chart](image)

The above is the landscape design color, lighting, logo, facilities, sharing several aspects of the description, hope that through the use of ergonomics, make people's lives more comfortable, work, learning more efficient for the inconvenience of the people To provide convenience, to provide people with a beautiful, comfortable, safe, healthy and harmonious human environment.

Portland Museum of Art Between the two red brick is the art gallery courtyard, a number of abstract bronze statue stands in the dark concrete floor, the courtyard floor shop is dark gray and light gray square wooden board, making the whole Contrast to the contrast of the lines on the ground, the minimalist style black metal round table and metal seat are placed on the floor. The whole tone is very simple and without bright colors, it is just like the minimalist style that the whole courtyard needs. It looks very relaxed and the atmosphere.

5. CONCLUSIONS

With the improvement of technology and the continuous development of economy, the relationship between environment and human beings is getting closer and closer, and people pay more and more attention to environmental problems, which requires designers to grasp the important principle of "people-oriented" in the design of landscape, Focusing on solving the problems and contradictions between people and the environment, so that the environment has a beneficial impact on people's work and study. This article discusses the ergonomics and landscape design color, lighting, logo, facilities, And how to better apply ergonomics to landscape design, and gives several excellent related examples. I hope that the narration of this article can provide reference for the research in related fields.
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