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Application and Expression of Artificial Light Source Design in Exhibition Space

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Abstract: The window of culture has the functions of cultural inheritance and emotional education. As the key content of exhibition design, lighting is not only an effective way to create a good atmosphere for visitors, but also an effective way to improve the exhibition level. [Method/process] Lighting is the main factor affecting museum display. In order to maximize the effectiveness of exhibition, it is necessary to use lighting flexibly. [Conclusion] Through the research on the lighting design of the exhibition space of the museum, this paper analyzes the artistic effects and impacts of different forms of lighting, and on this basis, discusses the application principles and methods of lighting design in the exhibition design of the museum, so as to provide a theoretical basis for creating a display space that conforms to the visitors' cognitive behavior and can reflect the cultural connotation of the exhibits.

Keywords: Museum exhibition space lighting design.

1. Introduction

Mr. Pei said, "Light has always played a very important role in my architectural design. I like early Cubist sculptures very much. If there is light, we can appreciate them, and architecture is the same. Light plays an irreplaceable key role in architecture. If there is no change in light, the form will lose its vitality, and the space will become powerless. The priority in design should be the design of light."

With the development of economy and society and the increasing enrichment of people's spiritual and cultural life, museum construction has also been developed rapidly. An important indicator to measure the level of museum construction is the rationality of lighting design. The comfortable indoor lighting environment can improve people's quality of life and bring people health, safety, comfort and other feelings. Through the research, it is found that most of the current academic research is based on pure theory, while it is not common to study the results of modern museum lighting design from the perspective of combining people, environment and art. Based on the investigation of the 1911 Revolution Museum in Wuhan, this paper proposes reasonable suggestions for modern museum lighting in order to provide useful reference for modern museum lighting design.

In this paper, the exhibition space in the contemporary art gallery is designed and studied from its existing architectural background。Explore equipment conditions and space forms, and propose analytical and referential design strategies and methods to, It is committed to improving the exhibition work and exhibition experience in contemporary art museums in the theory of design, The combination of science and technology and aesthetic experience, I hope this paper can deepen the design theory of this part of details to a certain extent on the basis of the architectural discipline system, so as to explore new possibilities and multi angle thinking, The reference basis of the test questions.

Because the development of contemporary art museums in China is relatively late, the guiding ideology of the existing art museum architecture is, the updating of the cultural consumption market environment has not followed up the iteration of contemporary art in a timely manner, and the existing exhibition space of contemporary art museums has a certain degree of conservative bias and disjoint trend with the constantly developing and innovative forms of contemporary art. This paper will start from the perspective of how to design exhibition space suitable for the context of contemporary art, Conduct field research and design experiments among the building subject based on the given specific conditions of contemporary art museums, summarize excellent cases and research results, and combine them with the experimental experience experienced by individuals, hoping to provide help for the design of lighting exhibition space in domestic contemporary art museum buildings in the future.

2. Museum Lighting Design Concept

The origin and development of museum exhibition space If you want to clearly understand the origin and development of museum exhibition space, you must first understand the origin and development process of the museum. "The museum is a complex institution that is difficult to define." A person's attitude towards museums directly affects his definition of the concept of museums. Douglas Allen pointed out that "a museum, in short, is a building in which collections are stored for observation, research and appreciation." In 1995, the International Museum Association defined the museum as "a non-profit permanent institution open to the public that collects, protects, studies, disseminates and displays material evidence of human beings and human environment for the purpose of research, education and appreciation, serves the society and its development." This is also the most authoritative overview of the definition of museum. The term "museum" originated in the West. In the embryonic period of the museum, the function of the museum was only to offer and collect objects, and the display design had not entered the historical stage. However, for a long time in the history of development, museums were exclusive to the nobility. For example, the Louvre Museum in Paris, France, was only open to the nobility until the end of the 17th century.

It was at this time point that museums began to really enter the public view. Following this, the royal palaces in other European countries have also been opened to the outside world. Originally, they were private rooms for nobles, but gradually turned into museums open to the society.

Museum exhibits are important cultural relics for studying the development of human civilization, and all exhibits have inestimable value. The reason why the colors of the exhibits that catch the eye of the viewer are different is that the quality of the light is different when it is projected. Therefore, the lighting design in the museum should be based on the principle of restoring the original color, texture, and level contrast of the exhibits, so as to truly restore the culture and history at that time. The purity of the color and tone of the exhibits will be affected by the color rendering of the light source. The special LED lighting chip in the museum can raise the color rendering index of the light source to 95. It is a common method to combine general lighting with local key lighting in museum lighting design. For exhibits of different sizes, their methods are also different.

"All objects have colors. If there is no color, the world will become dull and lifeless." The color in the space will change slightly according to the change of light factors First of all, "with the increasing socialization and functionalization of human feelings for color, more and more symbolic meanings are given to color, and the associative content of color feelings gradually changes from concrete things to abstract emotions and artistic conception." We usually think that colors such as red, orange and yellow can give people a warm, excited and high-spirited emotional experience, while some colors such as blue and green can give people an emotional experience of calm, depression and life, so different colors can bring people different emotional experiences. These emotional experiences are brought to us by color synesthesia, and we instinctively associate color with emotion. Color synesthesia is often used in space design. Color has a sense of temperature, distance, weight, area, movement and stillness. Different feelings often have different emotions.

3. Analysis of the current situation of light environment in museums

The real development of China's museums should start from the founding of New China. Song Xiangguang, a professor from the School of Archaeology, Culture and Museum of Peking University, divided the development of museum exhibition space in China into three stages: museum exhibition space in the early days of New China, museum exhibition space in the 21st century, and future museum exhibition space. In the early days of the founding of New China, "the exhibition contents of the museum mainly focus on social development, showing the social characteristics and achievements in economic, cultural, military and technological development of China's past dynasties." The exhibition space of the museum is more regular, square, and natural lighting. On the exhibition route, it is usually straightforward, and the display equipment is mostly ethnic furniture.

It is the original intention of museum lighting design to fully express the aesthetic feeling of the exhibits by lighting. However, there is no standard for museum lighting design in China at present, which leads to many problems in domestic museum lighting. At present, there are three kinds of museum buildings in China: one is specially designed; Second, use general exhibition halls to transform; The third is to use ancient buildings. The current situation of artificial light sources in different buildings can be summarized as follows:

1)Artificial lighting is basically divided into five types:

First, general lighting; Second, regional lighting is combined with general lighting; Third, directional area lighting; Fourth, directional area lighting combined with general lighting; The fifth is the lighting of the display case.

2)Lighting level:

First, natural lighting is mainly used, supplemented by artificial lighting, and the illumination of the pictures or exhibits reaches 19001X, which varies greatly with the location, climate and display time of the exhibition room; Second, if natural lighting is combined with artificial lighting, the lighting will vary according to the position and shelter of the lighting window, and the change will be large;

3)Light source and lamp:

The light source mainly includes LED lamp, fluorescent lamp and incandescent lamp. The lamps are mainly market general lighting lamps.

4)Showcase lighting:

The light source in most museums is not well shielded, and the primary and secondary light reflections are serious.

5)Protection and custody of exhibition cabinets:

Most exhibition halls have no UV protection measures. Due to the lack of funds for domestic museums, it is difficult to fundamentally improve the current lighting situation.

4. Reflections on the Lighting Design of the 1911 Revolution Museum

4.1. The choice of lighting should be consistent with the educational function of the museum

When selecting lighting, it must match the environment and atmosphere of the museum. Because the museum exhibits cultural relics, collections, antiques, etc., it not only improves the aesthetic taste of visitors, but also plays an educational role for visitors. There are also some museums where the collections on display are very precious and span a wide range of years, reflecting the broad and profound cultural connotation of China. It also enhances the visitors' sense of pride and identity.

4.2. The choice of lighting should be able to protect the exhibits

The exhibition cabinet of the museum is the last coat of the exhibits presented to the audience, and also the last line of defense for the protection of cultural relics. Just like what people often say, the saddle of the horse and the clothes of the man. The selection of the exhibition cabinet of the museum should not only effectively reflect the best state of the exhibits, show the cultural atmosphere and artistic charm of the exhibits, but also provide the best protection for the exhibits. What are the design requirements for lighting of cultural relics display cabinets? Take the 1911 Revolution Museum as an example.

4.3. The choice of lighting needs to consider the convenience and comfort of visitors

It should be noted that visitors are the focus of the museum in performing its social functions. When setting the lights, the visual experience of the visitors must be fully considered to

make the visitors feel convenient and comfortable. If the light is too dazzling or makes the visitors feel uncomfortable, then the visitors are unwilling to stay and watch. Therefore, in the process of designing the lighting of the exhibition hall, it is necessary to prevent the use of excessive height lighting. Because too high degree of illumination will make the exhibition hall too bright, too brilliant, lose the educational function of the museum, and it is also bad for the eyes of visitors. As the comfort level of human eyes is basically around 1000 lux, if the lighting of the museum exceeds this range, it is easy to make visitors feel uncomfortable. However, the light in the exhibition hall of the museum should not be too dim. Because too dark light will affect the viewing of visitors, and even make visitors lose interest in watching.

5. Application of Lighting Design in Museum Exhibition Space

5.1. Anti-ultraviolet measures

The 1911 Revolution Museum was designed ten years ago, so most of the exhibition halls have no UV protection measures. However, with the continuous development of China's economy and national strength, many new museums have begun to expand the investment in exhibition lighting. The exhibition cabinet in the museum is the last coat of the exhibits presented to the audience, and also the last line of defense for the protection of cultural relics. The selection of the exhibition cabinet in the 1911 Revolution Museum should not only effectively reflect the best state of the exhibits, show the cultural atmosphere and artistic charm of the exhibits, but also provide the best protection for the exhibits.

5.2. Considering lighting requirements from the perspective of display and storage

For museums, in order to let people, enjoy the exhibits, the lighting designed should be able to faithfully reflect the color and physical characteristics of the exhibits, and at the same time, avoid damaging the exhibits. The purpose of the museum is to collect rich materials, precious cultural relics, objects, models or replicas for viewing and safekeeping. It is also a place for academic research. Therefore, for the purpose of viewing, it is required that the brightness contrast and color of the observation object can be displayed as ideal as possible. When taking investigation and research as the observation purpose, it is necessary to correctly show the shape, color, texture, etc. of the observation object. In addition, in order to prevent the exhibits from being damaged by heat and chemistry due to visible light, ultraviolet light and moisture, it is necessary to comprehensively consider the protection of the exhibits and the safety of visitors, and find out the appropriate illuminance value.

6. Prospect of emotional design of exhibition space in museums

As a kind of construction facing the public, serving the society, adapting to the needs of the times and having a certain social education mission, the museum. Building is of great significance in modern society, and people have higher and higher requirements for exhibition space in museums. In the paper, In the process of writing, I have a deeper understanding of the theory of emotional design and the design of exhibition space in museums. The lack of professional knowledge, the museum exhibition space emotional design research is not deep enough. This article is exhibited in the museum. In the design of exhibition space, emotional design methods are combined to provide new design ideas and means for the design of exhibition space in museums, Meet the public's demand for a higher level of exhibition space in museums.

The above views are from the museum that the author has passed for many years

The practical experience is summarized. Exhibition space in the museum As an important part of the exhibition, design is an exhibition The key to the success of the project. The first step in design is to charge Decompose and read the exhibition contents, make use of space design principles,

Grasp the language of space design and combine it with the museum Science, psychology, ergonomics, architecture, beauty Knowledge of related disciplines such as learning To make the exhibition space of the museum more With cultural charm and social attraction, it can be better displayed The historical and social value of museum exhibits.

To sum up, with the development of society, museums, as social service spaces, are increasingly favored by the general audience. As a kind of building facing the public, serving the society, adapting to the needs of the times and having a certain social education mission, the museum is of great significance in modern society, and people have increasingly high requirements for the exhibition space of the museum. Lighting plays an important role in the realization of museum exhibition objectives and functions. With the continuous deepening of people's understanding of museum exhibition and the continuous updating of science and technology, the application methods of museum lighting are more diverse and the forms are more novel. The visual space created by lighting has a strong expressive force. In the design of museum exhibition, we should make full use of the guidance, shaping and artistic conception of lighting, follow the principles of education, functionality and humanism, closely contact the on-site space and theme style of museum exhibition, and actively introduce a variety of intelligent lighting equipment and lighting design methods, so as to achieve the objectives of museum exhibition The cultural display and the deepening of the communication platform lay a solid foundation.

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