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Research on the Boundary Space Design of Exhibition Building Based on Symbiosis and Sharing Concept

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Abstract. In recent years, China's exhibition industry has shown a stable and rapid development trend, the construction scale of exhibition venues continue to expand. In order to further improve the research on the integration and symbiosis of exhibition buildings and urban space, based on the concept of symbiosis and sharing of biology, this paper takes the boundary space of exhibition building as the research object, analyzes and discusses the general situation and design principles of the exhibition building boundary space, and elaborates and analyzes its design points from the macro, meso and micro levels, hoping to provide a useful reference for the follow-up research of exhibition buildings.

Keywords: symbiosis theory; sharing concept; exhibition building; boundary space.

1. Introduction

The academic concept of “symbiosis” originated from the field of biology, with the gradual deepening of related research, the rich connotation of symbiosis thought has been extended to various disciplines, and the integration of symbiotic sharing concept into architectural design is also the only way to meet the development of the times. The diversified, open and socialized architectural attributes of exhibition buildings make it necessary to build a symbiotic relationship with urban space, in this process, the boundary space plays a tie role in the coupling of the two, which is of great significance to the construction of the buildings external environment.

2. Overview of exhibition building boundary space

2.1 Concept and types of exhibition building boundary space

The boundary space starts from the external interface of the building and extends to the surrounding environment space, it is the transition area between the internal architectural space and the external environment space (Fig.1), which bears the functions of connection, penetration, barrier and distinction. As an exact type of space, the boundary space is usually composed of vertical interface elements (roof, wall, etc.) and horizontal interface elements (square, enclosure, landscape, etc.)[1], users identify the existence of such space according to subjective feelings such as perception, vision and touch.

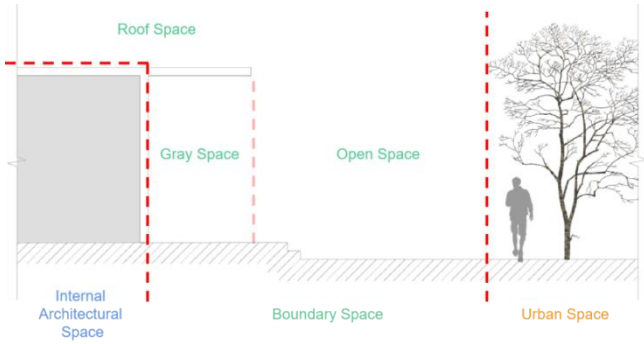

Fig.1 Boundary Space Diagram

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For exhibition buildings, its boundary space can be divided into four types according to the functional nature: square type, functional type, traffic type, logistics type. Among them, the traffic and logistics type boundary space basically belong to the extension and matching of the internal functions of the exhibition building, so the publicity of its function is low and the freedom of space design is small. As a space medium for direct energy exchange between exhibition building and urban space, the construction level of square and functional type boundary space is directly related to the integration state of architecture and urban environment, therefore, the design strategy research of this paper is more targeted at square and functional type boundary space.

2.2 Problems in exhibition building boundary space

2.2.1 Lack of integrated planning

Many exhibition venues have not paid enough attention to the boundary space in the early planning stage, the boundary space often exists only as the supporting role of the main venue, the two cannot form a balanced symbiotic relationship in space volume and area, which makes the hierarchy of boundary space unclear and the internal organization chaotic.

2.2.2 Lack of public affinity

Under the background of China's accelerating urbanization, the urban coverage is expanding, and the surrounding land space of exhibition building is constantly compressed. As an outdoor place to promote interpersonal communication, many boundary space is difficult to reflect its due "sharing" utility, the lack of interest and public affinity also makes the transition relationship between architecture and city stiffer.

2.2.3 Homogenization phenomenon

The design of exhibition buildings emphasize landmarks, but the creation of the boundary space is often lack of consideration for the characteristics of the site, the design is lack of novelty, and the homogenization phenomenon is serious, which makes the boundary space and the main body of the venue less relevant, which is not conducive to cultivate the sense of place in the space experience.

3. Design principles of exhibition building boundary space

3.1 The principle of integration

The integral design of the boundary space includes two aspects: functional integral and environmental integral. The former refers to the boundary space must have a relatively clear type of function, such as exhibition, distribution, transportation, public activities and other functions together constitute a complete boundary space; the latter means that in the shaping of the boundary space, the architectural form, site elements, spatio-temporal continuity and other influencing factors of the surrounding environment should be fully considered, so as to make the boundary space rich in changes and coordinate with the environment.

3.2 The principle of scale

Scale is of great significance for shaping urban space, the scale of boundary space will have a direct impact on the user's spatial experience and behavior. By limiting the area and scale of the site, the form of boundary space is controlled within a reasonable range, so as to realize the practicality and scientificity of the boundary space design[2].

3.3 The principle of humanistic

The progress of the exhibition concept has given people a more diversified way of exhibition activities, which inspires architects to pay attention to improve users' psychological interaction and perceptual experience. No matter what kind of boundary space creation, its final foothold is the

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actual user of the space, with the scale and needs of people as the design criteria, reflecting the user from the inside out, comprehensive and lasting humanistic care[3].

4. Design points of exhibition building boundary space

4.1 The boundary space design points in macro-level

4.1.1 Conform to Urban Development Layout

As a large public building in the city, the site selection and overall planning of exhibition building must be adapted to the urban development status and the layout of the surrounding formats. Especially for the functional type boundary space, the construction of its close connection with the urban format is the prerequisite for the sustainable development of the building space, its construction should be based on the type characteristics and distribution of the surrounding industrial clusters, and selectively supplement the urban supporting resources in the region, so as to further integrate the functional resources for efficient use.

4.1.2 Integrate into the natural environment

As a secondary environment created artificially, the boundary space and the external primary natural environment form a compound symbiotic relationship[4]. The premise of realizing the integration and symbiosis of the artificial environment and the natural environment is to eliminate extensive development and avoid the large-scale transformation and destruction of the original ecological topography. At the same time, it should be designed in combination with the local climatic conditions to improve the microclimate of the boundary space.

4.1.3 Echoing regional culture

The key to realize the inheritance of regional culture in the boundary space is to build an integrated symbiotic relationship among users, buildings and site environment[5]. Architectural elements with strong regional characteristics often becomes an important source of inspiration for the spatial forms creation. The local cultural characteristics should be deeply excavated into the design, so as to realize the sublimation of traditional cultural elements with advanced modern technical means.

4.2 The boundary space design points in meso-level

4.2.1 Creating composite boundary space

The composite design of the boundary space is mainly reflected in the combination of function and form: the function composite is mainly combined with the function orientation of the building, introducing a variety of functional types in the boundary space to create a highly adaptable activity venue; the spatial morphology composite mainly through the introduction of multiple spatial levels in the boundary space, through micro-terrain changes, air corridors, viewing platform and other means to build a three-dimensional spatial structure, emphasizing the readability of the spatial boundaries.

4.2.2 Creating open and flexible boundary space

In the boundary space design should be open and shared spirit of the city as the guiding ideology, use boundary space to fuse building exterior interface and urban space, encourage the outdoor space and the urban environment to establish close interaction, to create a flexible, free and diverse public places.

4.2.3 Creating creative and vitality boundary space

For the creative design of the boundary space of the exhibition building, its ideal goal is to create a vitality space that is integrated with the urban environment and has a unique personality that difficult to replicate. At the same time, although the boundary space has certain urban public space attributes, it still belongs to the spatial component of the exhibition building, therefore, the creation

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is based on the creative and personalized expression of space under the framework of exhibition building characteristics.

4.3 The boundary space design points in micro-level

4.3.1 The participatory design of landscape nodes

Landscape nodes are the main component of the boundary space landscape system. The usual way to improve the participation of the landscape is to avoid creating a large area of public green space that lacks design and interaction. Through the reasonable collocation of elements such as landscape sketches, green vegetation, water and so on, the landscape node with both natural beauty and artistic beauty is constructed, and the buffer space between the building and the city is enriched with diversified landscape elements, so that users are willing to participate.

4.3.2 Artistic design of public facilities

In the boundary space of the exhibition building, the corresponding public facilities are usually placed according to different functional requirements. On the premise of meeting the basic functional use and safety requirements, the shape, color and material of the public facilities can be processed in the form of a combination of creativity and function based on the artistic vocabulary, make it have certain artistic value and cultural connotation on the basis of adapting to the theme of boundary space.

4.3.3 Artistic design of ground pavement

As one of the important elements of boundary space, ground pavement not only has basic practical functions such as bearing, guidance and safety protection, but also can play a role in interpreting space theme and setting off scene atmosphere. Through the detailed design and psychological hints in the aspects of pattern, color, texture and material, so as to create the pavement form with art, culture, unique characteristics, which can subtly convey the cultural artistic conception and spiritual connotation contained in the boundary space design.

5. Summary

The core idea of the symbiosis theory is to promote the mutually beneficial and sustainable development of architecture and city. As a bridge between exhibition buildings and urban public space, boundary space is closely related to urban environment and people's life. Guided by the concept of symbiosis and sharing, this paper discusses the design points of the boundary space of exhibition buildings, hoping to provide useful ideas and methods for future exhibition building design.

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