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## Analysis of Design Philosophy and Utility Function of Library Building

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### Abstract

The design of most modern library buildings is based on the characteristics and service objects of library, for which the latest achievements of modern technology are made full use of. Usually, modern libraries are designed to be with various different functional zones and boundaries, and uncrossed reader, book and librarian transportation streamline. The design ideas of “openness, factualism, containment, innovation, and people and service first” are reflected in library services via construction planning and design. Besides, library buildings are given certain functions in combination with the actual situation of library and readers’ needs. This paper is intended to, in combination with the author’s several years of work experience, discuss the design philosophy and utility functions of the library building from the aspects of design of major structure of building, foundation facilities design, furniture design, and color design, which is of certain reference value.

**Key words:** Library; Architecture; Design concept; Practical function

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### INTRODUCTION

As people pay more and more attention to spiritual pursuit, the number of newly-built libraries increases

sharply. Different library buildings are constructed according to different design philosophies and have different utility functions. For purpose of this paper, case study of several domestic and foreign library buildings is to be made to discuss the design philosophy and utility functions of library building. The selected libraries are cheerful, or simple, or anomalous, but all have the characteristics of combination of humanity and nature, strong artistic appeal, humanism, diversified functions, and open space.

## 1. DESIGN OF MAJOR STRUCTURE OF BUILDING

### 1.1 Design of Stairway and Passageway

The New Stuttgart City Library (designed by Eun Young Yi), Openbare Bibliotheek Amsterdam (designed by Jo Coenen), and National Library of China (designed by Johannes Reinsch) are designed to be with spiral stairs, so that readers can get everything of the layout of library at a glance while climbing the stairs, and experience the wonderfulness of space and magnificence of building. The especially notable thing is that there is a set of the Complete Library in the Four Branches of Literature delicately packed in bright color placed on the bottommost bookshelf, which forms a delightful contrast to the stairway to form a beautiful picture scroll. As to passageway design, each library has its own characteristics. The shell of the Venuesla Library and Culture House (designed by Helen & Hard Architectural Firm) and the New Stuttgart City Library are of jacketed wall (built with glass brick), and between the walls is a unique walk space set. In the Seattle Public Library (designed by Rem Koolhaas), a cycle track is specially set between the inner glass curtain wall and the outer steel frame. Meanwhile, large guidance signs are set beside the staircases and escalators, avoiding the dullness of space and having the guidance function.

## 1.2 Lighting Design

Lighting is an important element of library building design, and the thematic features of the library building also are realized via rational application of lighting. Thus, it is supposed to ensure a proper match of vignette and real light and sufficient lighting indoors. By rationally making use of the language of light art can be the theme and environment of specific library building be depicted, to further highlight the theme of the library building. Designers can create an emotional environmental atmosphere via light shape, color, layer and tone, to highlight the thematic culture of the library building. Usually, both artificial lighting and natural lighting can create different thematic cultures of library.

Hubei University library, in the aspect of lighting design, adopts the mode of “inletting light from two ends and humping the middle of ceiling”, to weaken over intense light, and ensure the lighting of the whole interior environment of the library via natural light. National Library of China also has made full use of natural light from the skylight, adopts the “set-back model” in respect of space design, so that readers can appreciate the sceneries of the whole city through the windows. The Seattle Public Library has made full use of natural light in the process of building design, making natural light shine over the whole library. Besides, its whole exterior wall is built with a glass curtain wall. Since Seattle is year-round rains, rain can wash the dust off the glass curtain wall. New Stuttgart City Library adopts natural light free from glare rather than direct lighting. The Free University’s Faculty of Philology Library (designed by Foster Partners) consists of seven storeys, and natural ventilation is taken to all the storeys. Additionally, semi-transparent glass lighting is adopted for condensation. Readers can look into the sky through the skylight when tired.

## 1.3 Sign Design

The Free University’s Faculty of Philology Library, to improve its culture deposit, arranges its logo on the ground at the entrance of the library building. The Seattle Public Library also sets its logo reading “Seattle Public Library” on the ground at the entrance of its library building. The Vennesla Library and Culture House design its “cultural” logo on its ground and walls, and print words in different languages on the wood floor of the international reading zone on the ground floor. The words are excerpted from the original classics, standing for smooth cross-cultural communication.

## 1.4 Space Design

The space design of the new Peking University library follows seven principles: (a) Integration, integrating the east and west buildings, of which the east building was transformed first, followed by the rebuilding of the west building; (b) long-term plan, with a purpose to build a one-hundred-year library and maintaining its status as landmark of the university; (c) openness and harmony,

to closely link with the campus environment and reflect the traditional style of the university; (d) permeation and flexibility, to be forward-looking in function layout and adjustable with readers’ needs and library development; (e) space design, to be natural, poetic, aesthetic, creative and humanized; (f) environment design, to be green, energy-saving and environmentally-friendly, and take account of people, books and equipment respectively; (g) visitor flow and material flow, to be orderly, smooth, quiet, realize dynamic-static separation, and reduce intersection as far as possible. Sichuan University Library, when transforming the old library, also paid special attention to various aspects of space design: equipment, replacing the air-conditioning and ventilation system that have been aged and cannot meet the user needs in respect of energy consumption and efficiency as a whole, adjusting the layout of rest room, and replacing equipment of rest room, and adding rest room for the disabled; exterior finishing material of the east building, especially the roof tile, replacing the exterior finishing material as a whole to avoid high-attitude falling of objects, and updating the appearance by replacing the less durable and non-stain-resistant coating with granite; color of some materials of external façade, replacing the aluminum color of the east façade with the tasteful matte coppery to harmonize with the overall style of the university; internal functions of library for communication and diversification, adding exhibition area on the north side at the first floor, and changing the south wing into an international exchange multi-function hall. Besides, the interior furnishings were replaced in the secondary interior design as a whole, to create a better interior environment for teachers and students.

The Free University’s Faculty of Philology Library consists of 27 prefabricated laminated wood rib structures. Under the winding and rolling wooden structures, there are bookshelves like alcove, and benches formed by folded rolling curtain boards, providing comfortable seats for readers. The band-shaped boards subtly combine with carrels, forming private rooms. The structure design similar to ribs of animals provides a spacious and comfortable interior space.

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## 2. FOUNDATION FACILITIES DESIGN

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### 2.1 Outlet Design

The carrels in the Seattle Public Library are provided with electrical socket outlets and network ports, facilitating readers using charging equipment (such as mobile phone, notebook computer, etc.), and free WIFI. National Library of China and the Seattle Public Library follow the same principle in respect of outlet design, where the carrels are provided with electrical socket outlets and network ports. In the Openbare Bibliotheek Amsterdam and Vennesla Library and Culture House, there are several retrieval machines, which can meet readers’ needs, and makes it unnecessary to specially set an e-reading

space. Meanwhile, the combination of black of computer monitors and white computer desks makes the whole reading environment tranquil, simple and elegant.

## 2.2 Lamp Design

In the Seattle Public Library, each seat is provided with a little lamp right ahead in the reading zone, which exactly can cover the seat. Readers can choose to switch on or off the lamp at their own discretion, to meet their lighting needs without disturbing others. Shantou University library, to ensure good lighting of the bookshelf zone, sets star-shaped lamp in the bookshelf zone rather than traditional rows of tubes, and table lamp for every carrel that can be switched on or off by readers. The Free University's Faculty of Philology Library, to facilitate readers reading in any posture, sets table lamps with adjustable shade. The Openbare Bibliotheek Amsterdam, to achieve the best lighting effect, designs stripe-layout lamps. The Vennesla Library and Culture House set a huge lighthouse at each floor. In the lighthouses, several high-power tubes are installed, for lighting, increasing the sense of order of the space, and having the function of guidance.

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## 3. FURNITURE DESIGN

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### 3.1 Bookshelf Design

The Free University's Faculty of Philology Library, in the process of bookshelf design, uses diagonal tension type steel bars for backboard of bookshelves, which act as baffle, reduces the consumption of backboard materials, and gives a feeling of permeation. Shantou University library basically adopts bookshelves straight above and gradient below (usually of 6 layers), to facilitate librarians arranging books and readers taking books. With such bookshelves, librarians don't have to kneel to arrange books on the bottommost layer, and readers don't have to fully squat to take books from the bottommost layer. Besides, in the circumstance of earthquake, the bookshelves of such a structure also don't fall easily to injury people. The Openbare Bibliotheek Amsterdam is more distinctive in respect of bookshelf design. It sets semicircular bookshelves in the sharing zone, with several leisure sofas in different colors surrounding the semicircular bookshelves, making people feel free. It is especially impressive that the semicircular bookshelf with the longest perimeter is as long as 45 meters, which undoubtedly is like a huge circular cd-rom database.

### 3.2 Design of Desks and Chairs

As to the design of desks and chairs of modern library building, U-shaped, S-shaped and ring-shaped designs are common. Via U-shaped, S-shaped and ring-shaped designs, carrels can be united together, and readers can pass in and out without disturbing others. In traditional libraries, readers usually sit face to face around a table. Meanwhile, in modern library building, carrels usually

are arranged beside windows, so that readers can look into the distance rather than a dense or dark mass of heads or carrels. Meanwhile, the carrels in most modern libraries are set with baffles of different sizes for storage of personal belongings or installation of table lamp or outlets, which also has the function of creating privacy.

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## 4. COLOR DESIGN

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### 4.1 Mix-Match

Shantou University library paints its western exterior façade in green. When the sun rises in the morning, the sunshine is on the green wall, making the sunshine more soft. The Free University's Faculty of Philology Library paints the hanging footway on the 5<sup>th</sup> floor in orange, and sets soft lamplight, blue-dark floor, and silver guardrails, making the whole hanging footway cheerful and cozy, and quell walkers' fears. Meanwhile, it also paints the stairway of each floor in different colors, including beige, grey, blue, etc., and sets the main colors of the internal walls of the whole building of grey and white, to avoid interference of noisy colors. The Seattle Public Library divides the reading space into multiple zones by colored floor (violet, white, black and red). Meanwhile, it paints the escalators in fluorescein, giving a streamline feeling of brightness and dazzle, and the stairway in red for cautioning walkers.

### 4.2 Single-Match

The internal walls of the New Stuttgart City Library are in two colors only, i.e. grey and white, giving a feeling of tranquility and freshness to readers. In the Vennesla Library and Culture House, the desks, chairs, floors, ceilings, bookshelves and walls all are in beige, making readers feel intimate, cozy, quiet and natural.

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## CONCLUSION

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In a word, in the design of most modern library buildings, the characteristics and service objects of libraries are taken into account, and the latest achieves of modern technologies are made full use. In this way, libraries are designed to be with various different functional zones and boundaries, and uncrossed reader, book and librarian transportation streamline, reflect the design ideas of "openness, factualism, containment, innovation, and people and service first" via library services, and be with certain functions in combination with the actual situation of library and readers' needs.

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