

# *Research on Residential Space Unit Design Based on "Commercial" Concept*

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**Abstract:** With the continuous improvement of people's living standards in China, the demand for living environment is becoming more and more perfect, which promotes the development of urban design residential units. However, due to the continuous increase of population and the increasing shortage of land resources, the development of urban design residential units has been severely limited, thus affecting the sustainable development of the city. As a result, housing prices have also risen. Many families have worked hard to buy a house for most of their lives. However, the area of the building is limited, and sometimes it cannot meet the needs of the family population. At this time, the layout design of the house is particularly important. This paper studies the path, strategy and method of residential design from the perspective of 'residential business', in order to meet the needs of users as the core to build residential design layout. This paper analyzes the influence of the concept of "housing business" on the layout design of the house, and how the design of the house can get better function under this concept, so as to realize the greater value of the house.

## **1. Introduction**

With the reform of the economic system and the deepening of the diversified demand for urban housing, 'people' has become a crucial element in urban housing design [1]. Urban housing design carries the context of a city or even a country, and is the symbol and representative of the national context and ecological return [2]. To achieve all the design concepts and design development, it is necessary to take 'people' as the cornerstone and implement the design idea of taking people's needs as the main body [3]. It is the inevitable requirement of urban housing design. The humanized design should not only start from the needs of people's daily life, but also from the 'people' as a social collective to the overall investigation, with the overall concept to achieve individual design [4]. This paper analyzes the development trend of current residential design and user needs, links the design concepts and theoretical methods in actual cases with the current residential design layout, and proposes a common residential design path, principles, methods and breakthrough points. This paper makes some thinking and research on the layout of the current residential design, and draws some design concepts and practical methods on how to rely on the user's needs for residential design, which provides some references for the follow-up researchers and industry practitioners.

## **2. The Concept of "Residential Business" and Residential Space Apartment Design Overview**

### **2.1 Overview of the Concept of 'Living Business'**

Lu Wei, the author of the concept of "housing business" and a Chinese residential research scholar, has formed a set of knowledge system of "housing business" based on his nearly 20 years of experience in residential design and residential research. Residential quotient, literally, can be understood as "the wisdom of living [5]." In general, the "wisdom of living" can also be understood as "the ability to live." It refers to how a person plans, designs and arranges the living space, how to meet the needs of life through various ways, and how to make himself comfortable and exquisite through the rational use of space.

### **2.2 Overview of Residential Space Apartment Design**

Residential space apartment design refers to the process of layout and planning of residential interior space in order to meet the needs and comfort of residents in architectural design. The goal of the design is to create a reasonable function, smooth flow, livable and comfortable living environment [6].

The content of the apartment design can be considered from the following aspects:

(1) Functional partition: a good apartment design should be based on the needs of residents, a reasonable division of different functional areas, such as living area, bedroom area, kitchen area, bathroom area. In this way, the space of different functions can have a clear boundary, and at the same time, they are connected to each other to facilitate daily life [7].

(2) Spatial streamline: the streamline between different functional areas should be considered in the design of the house, that is, the moving path of people in the living space. A good design should make people move smoothly in the living space, avoid unnecessary turns and obstacles, and improve the convenience of living.

(3) Lighting and ventilation: The location of windows and doors should be reasonably arranged to ensure sufficient natural lighting and ventilation in the room. Adequate lighting and ventilation can improve the quality of life of residents, but also help to save energy.

(4) Spatial proportion and scale: The spatial proportion and scale in the design of the house type should be reasonable. The size of different functional areas should be coordinated with each other to make the whole space look harmonious and unified. At the same time, the design of the apartment also needs to take into account the actual needs of the occupants, and reasonably allocate the space size to meet their living needs.

(5) Practicability and aesthetics: The design of the house type should not only consider the practicality of the space, but also pay attention to the aesthetics. In terms of functional zoning, furniture placement and decoration, it is necessary to create a practical and beautiful living space according to the preferences and lifestyle of the occupants.

All in all, a good residential space design should be able to meet the needs of the occupants, to provide a comfortable, practical and beautiful living environment. At the same time, designers also need to take into account the space streamline, lighting and ventilation, etc., in order to create a reasonable function, livable and comfortable living space.

## **3. Residential Apartment Design Strategy Based on 'Residential Business'**

### **3.1 Horizon Space Significantly Large**

(1) Red ruler and blue ruler. The definition of red ruler is the maximum visual distance of people

in the direction of face width, while the definition of blue ruler is the maximum visual distance of people in the direction of depth. The larger the visual range defined by the red ruler and the blue ruler, the larger the small home [8].

According to a house map and a red pen, a blue pen. The requirement of the house type diagram is that you must be able to see the dark load-bearing wall and the light non-load-bearing wall. First of all, along the direction of the unit parallel to the window, in the public space between the widest place - in general is the living room - from the west wall to the east wall, draw a red arrow. Then in the direction perpendicular to the window, from the living room to the dining room, the south wall to the north wall, along the public space into the deepest place, draw a blue arrow.

(2) Three-way space, refers to the following three-way, ventilation, light, empathy. In the public area of a home, several functional areas connected by non-real walls share ventilation and lighting, and are conducive to the exchange of sight between family members and the transparent space of emotional integration. In a small home, except that the bedroom and toilet (wet area) belong to the ' private area ', other parts can be included in the ' public area '. With the permission of the structure, ' one dozen three links ' can be realized in theory. Remove the heavy and dull entity, and the partition wall is changed into a flexible and transparent light partition wall to create an open visual scale.

(3) The three-way menu, that is, the kitchen study closed balcony, children 's space, other space, with no wall, half wall, moving doors, windows open, red ruler position can be in the south, north or central area. Simply put, the more the solid wall barrier, the smaller the home; the more open areas, the larger the home. Remove unwanted non-load-bearing walls and make the public area of the home larger and more transparent. Instantly, the small living room becomes a large mansion full of sunshine. As for how to open up these spaces, there are three-way menus to choose from, which is also based on everyone's needs.

(4) The proportion of three-way, the proportion of three-way = (three-way space area / building area  $\times 0.8$ ) %. In theory, the denominator should be the inner area of the house, but most people only know the building area of their own home and cannot accurately calculate the inner area of the house [9]. Therefore, the average room rate of 0.8 is used as the coefficient.

(5) Vitality point refers to the functional area where people frequently move, often stay, and naturally communicate with their families in a family's public living space. In the traditional apartment layout, the vitality point is the default of two: living room and restaurant, two points and one line.

### 3.2 Functional Layout Practical

(1) Type II aisle, that is, the left and right sides of the aisle are accommodated or functional space, it is not only a function of traffic, but also by the left and right two-way reuse.

(2) U-shaped layout, both sides of the conventional aisle are walls, is a simple traffic effect. Teacher Lu Wei called it the O-type aisle, which is relatively poor in practicality. The type II aisle means that both sides of the aisle are living space or storage space, which improves the space utilization rate of the aisle. The type II aisle is applied in the end space to form a U-shaped layout. Used in the through space, it forms a Sichuan-type layout.

(3) Memory menu, the concept of space memory bar, refers to the function space and storage space, the longer the available memory bar, the more practical. The most commonly inserted ' memory strip ' depth and the corresponding function are listed into a ' menu ', and then only need to calculate the surplus area according to the minimum surface width, you can ' click ' yourself.

### 3.3 Detail Design for the Elderly

(1) Flat slip without height difference, is the whole house without height difference [10], as the

saying goes, people old first old legs. As the largest joint of the human body, the knee joint is also the first part of the aging phenomenon in the aging process. The balance ability of the human body decreases with age, and the elderly have calcium loss and fragile bone. An accidental fall, for young people, may be clapping buttocks up small things, but for the elderly may directly lead to fracture. If long-term bedridden injury, muscle atrophy, the elderly will be difficult to return to normal walking, a significant decline in the quality of life in old age.

(2) The basic height of the handrail is 85 cm [11]. The crossbar handrail is used to provide path guidance when the body moves horizontally. The installation position is such as a long corridor, a hall and a bathroom shower area. The function of the quick-drying handrail is to maintain the body along the standing state, maintain the body when the movement changes, stabilize the installation position of the snacks such as the side of the sliding door, bend the handrail to help the elderly get up safely from the sitting or squatting state, and stand the installation position such as the door shoe stool, toilet.

(3) With the increase of age, the elderly will gradually enter the walking assistance state [12]. Whether it is a walker or a wheelchair, or someone around to help, it needs a relatively wide door size, especially the bedroom door and bathroom door of the elderly.

(4) The house has a good three-way relationship [13]. The proportion of elderly couples who do not live with their children is quite high. Due to the significant decline in hearing and vision, if there are thick partition walls and doors between the homes, in case one of the elderly is in danger and the other cannot be detected in time, it may delay the treatment. Therefore, using more transparent materials and more flexible replacement walls can not only improve the light and ventilation of the living environment of the elderly, but also play a great role in emergency situations.

(5) Due to the aging or pathological changes of visual organs, the vision of the elderly is significantly reduced, and it is prone to danger in a dark environment. Therefore, the intelligent lighting design is very important.

(6) Life furniture corner is smooth, sharp raised furniture edge, right angle sharp cabinet door handle, improper position of glass, etc., are likely to bring harm to the elderly home life, to try to avoid, but choose the smooth chamfering design.

(7) In the event of a danger alarm pull, in all the equipment related to the old-age transformation, the emergency call device plays a very important role in the event of danger, and can even save lives.

(8) Accidental high incidence of bathroom check, bathroom area is the high incidence of accidents in the elderly [14], the elderly bathroom safety design is very important, such as bathroom threshold, squat toilet floor, shower room, water barrier, anti-slip degree of ceramic tile design should be in accordance with: comprehensive flat ground, dry and wet separation, suitable for the old sanitary ware three principles of design, can effectively reduce the occurrence of accidents [15].

## **4. Housing Design Practice Based on the Concept of "Housing Business"**

### **4.1 Project Overview**

Located on Yanyang Avenue, Dinghu New District, Zhaoqing City, Guangdong Province, the Pure Waterfront of Overseas Chinese Town is a residential part of the planning of Overseas Chinese Town in the western part of the Bay Area. The Overseas Chinese Town in the western part of the Bay Area covers an area of 8000 acres, including Kale Star Theme Park, Kale Industrial Base, Happy Coast Lingnan Water Street, Pure Waterfront High-end Habitat and other diversified formats. The residential type is: 98 m<sup>2</sup>-262 m<sup>2</sup> 3-5, the project planning and construction of 1283 households, the total number of 39 buildings, including villas, houses, and business. The house type of this design practice is 170 m<sup>2</sup> five-bedroom house types.

## 4.2 Customer Needs Analysis

(1) The main bedroom area expansion: feel that the main bedroom space is not spacious enough, want to expand the main bedroom area, and want to put the main bedroom adjacent bedroom, into the main bedroom space.

(2) Requirement of a study with a bed: When necessary, it can be used as a guest room. Sometimes after work, you will need to prepare PPT and open a video conference, and you need a separate office space.

(3) Do not accept the open kitchen: three meals a day are open fire, the kitchen is a regular use area, can not accept the open kitchen.

(4) The number of bathrooms can be reduced by one: two bathrooms are enough for daily use, and one can be assigned to the room to make the bedroom space more spacious.

According to the needs of the owners, according to the design theory of the concept of 'live business', the layout of the study and kitchen remains unchanged, the living and dining room space has made a suspended TV wall, which can distinguish the dining and living room space while lighting the space. The bathroom adjacent to the bedroom is included in the bedroom, the area of the bedroom space is expanded, the position of the door is changed, the desk and wardrobe behind the door is integrated, and the bedroom space is divided into the dynamic and static areas. The bathroom of the second bedroom of the room is separated, and the public toilet is made. The layout of the bedroom is unchanged, the main bedroom and the adjacent bedroom space are opened, the bedroom area is expanded, the position of the door is changed, the makeup table is designed in the middle, and the vitality of the bedroom is increased.

## 4.3 Overall Design Analysis



Figure 1: The maximum red ruler and blue ruler of the house type

(1) Plane layout analysis, the original apartment lighting is sufficient, the apartment has no darkroom, the overall shape of the apartment is square, the layout in the real estate apartment can be said to be relatively good, but the overall spatial layout is relatively compact, for the people who are more in pursuit of quality of life, the area of the bedroom space is small, can only meet the daily living function, and when the entrance space looks inside the apartment, there is no occlusion at the entrance, and there is no direct view of the house, and the invisibility is poor. The original red ruler is 7.3m and the blue ruler is 6m. According to our first large design concept, the maximum red ruler is 10.3m and the blue ruler is 9.7m in theory (Figure 1). However, due to the absence of occlusion at the entrance hall, there is no direct view of the house, and the invisibility is poor. According to the needs of the owner, the intermediate design suspension TV wall is selected to block the direct view of the living room. At the same time, it can also distinguish the functional zoning of the dining living room space.

(2) Restaurant space analysis, the spacious living room is too transparent, it looks very open, so we designed a suspended TV wall in the middle of the living room, in the protection of the privacy of the living room at the same time can also effectively separate the living room out of different functional areas, the design of the overall shape of the simple atmosphere, fashionable and elegant, the living room full of high-level sense.

(3) Kitchen space design, L-shaped layout, also known as semi-enclosed layout, showing the 'L'-shaped length-width ratio characteristics, in the space processing to follow a triangular principle. It is the most common kitchen layout in architectural design. It is often connected to a small balcony. When the kitchen area is small, it can open up the balcony and become a kitchen area. The function distribution is arranged in a word: cleaning pool, production area, cooking area, and the operation is unilaterally sorted.

(4) Bedroom space design, the bedroom is the most private living space, the perfect and comfortable bedroom is our soul busy day to rest comfort. The most important functional area of the bedroom is the sleep area, but in addition, there are generally basic functional areas such as storage and office dressing. Toilet, cloakroom, dressing table, bed and so on need to carry on the reasonable layout. In order to ensure a comfortable and beautiful sleep space, the color matching is mainly light and gentle colors, such as light gray, white, light blue, etc.

(5) Toilet space design, the bathroom of its function is more powerful, not only to meet the daily washing function, but also to reflect the owner's living level, personality and taste. The bathroom public health under this scheme adopts a half-wall dry and wet separation design, which is light and simple, elegant in temperament, and stirs people's vision with a unique modern style. The main bathroom has a bathtub, which reflects the owner's pursuit of taste life. The design is strictly in accordance with the three principles of comprehensive flat ground, dry and wet separation, and suitable for the elderly. The overall style is unified in tone, visually expands the sense of space, and the overall feeling is clean and tidy.

## 5. Conclusion

In general, China's urban residential design from the completion of the goal to the pursuit of quality, from a single residential design to the living environment and urban space of the multiple design, from economic to comfortable and then to the pursuit of ecological and intelligent constantly evolving. In the future, China's urban residential design will further develop in the direction of ecologicalization, combination of context and people, digitization, high density, diversification and personalization, and new residential models will gradually enter people's lives. And our designers should also have the courage to break through the rules and create Chinese-style houses belonging to our country. This is the call of the times and the mission that every young designer should shoulder.

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