

# Analysis of 100 square meters home decoration toilet suitable for aging transformation

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**Abstract:** Taking the total area of 100m<sup>2</sup> as an example, this paper discusses the reasonable design and transformation of the bathroom under the background of aging, analyzes the unsafe factors in all aspects of the home decoration bathroom, and puts forward the corresponding solutions, aiming at making the process of the elderly using the bathroom more safe, convenient and comfortable.

**Key words:** Bathroom; Suitable for aging; Transformation design; Scale research

## Introduction

As early as 2005, Shanghai City put forward the “9073” pension model. So far, family pension is still the most mainstream pension model in China. In the process of transformation, although the area of the toilet is small, it is also the place where the elderly are most prone to accidents, plus its function and use are very important and worth studying. In this paper, the 100 m<sup>2</sup> scale size of the house in the bathroom design, transformation of the analysis, hoping to provide practical theory and transformation basis for aging transformation.

## I. Introduction

### 1. Research background

Nowadays, China has entered the stage of deep aging, and the fewer children and the longevity of the elderly have aggravated the degree of aging in China. At present, the aging population and the saturation of the real estate market are difficult to solve, and the aging design and transformation will be a long-term research direction.

### 2. Research purpose and significance

Under the influence of China’s aging population, saturation of the real estate industry and the mainstream pension model of “9073”, we should explore more possibilities for aging transformation based on the background and trend of The Times. Age-appropriate design is closely related to every family. Based on the security of the life of the elderly, the renovation of the old residential areas in cities and towns is urgent. In the renovation process of home care for the elderly, the renovation of the bathroom is the most considered and the most complex. Because the old house has been designed for a long time and there are many problems left over, the renovation of the toilet is also necessary.

## II. The bathroom is suitable for aging transformation design

According to the survey of Wuhan Warm Garden, more than 95% of the elderly have experienced unsafe accidents in the bathroom, and most of the elderly live with their children, which shows the necessity of the renovation of the existing bathroom. The minimum internal size of the three-piece equipment toilet used by the elderly in need of wheelchairs is usually 1500×2225mm, which is a very small space. In the case of sufficient area, the area of the toilet should be increased to increase the use of space for the elderly. To 100 square meters or so of the house as an example, the area of the bathroom is about 5-6 square meters, this paper in accordance with this scale to analyze and transform a suitable for the elderly bathroom.

## III. The transformation of the design scheme

There are usually many problems in the bathroom of the elderly residence, such as the problems in the initial design, the problem of dry and wet separation, the problem of the original circuit of the house, the problem of non-slip on the ground, the unreasonable size and height of the item placement table or storage shelf, the lack of protective facilities, the unreasonable lighting facilities, and the ventilation problem of the bathroom. This article according to these deficiencies, combined with the reference to the actual situation of the transformation design.

### 1. toilet dry and wet separation design

For the elderly, the design of dry and wet separation is very important. In the case of wet floors, the elderly are easy to slip and have safety accidents. The simplest design of dry and wet separation can be glass partitions in the shower, and shower curtains and water bars to prevent water from flowing into other areas outside the shower. According to the needs of the elderly with different degrees of self-care, the design should be adjusted, such as the size of the shower room should be convenient for wheelchair access and activities. According to the size of the general wheelchair, the width of the shower door should be 800-900mm. The door of the bathroom should be a sliding door or an external open door, and the sliding door should be anti-derailment design. In the case of 5 square meters of the bathroom, the shower room can account for about 1.5-2 square meters, the minimum size is 1500×750mm. In addition, if the area is enough, a washbasin can be set up inside the shower room, which is convenient for work but also plays the purpose of optimizing dry and wet separation.

### 2. Design of auxiliary facilities for toilet

(1) For the elderly who are easy to fall and squat, the side wall of the shower room should be set up with an “L” shaped handrail, about

750mm from the ground. Safety handrails of appropriate height should be set on both sides of the toilet to avoid problems such as difficulty in action after the elderly go to the toilet for a long time. For the elderly who can't walk easily, the aisle wall can also be set up with safety handrails to assist walking according to actual needs, and the height of the handrails should be set according to the height of the elderly's upper limbs suitable for force.

(2) The shower stool is set under the shower head, about 450mm from the ground, which is conducive to the free movement of the elderly.

(3) Multi-functional shower facilities should be set, generally four functions as one, the head of the large shower, handheld small shower, there is a certain water pressure cleaning spray, ordinary faucet. Can be adjusted according to the economic situation to buy, at least there should be a large shower and small shower, easy for the elderly to bathe. In addition, the logo of various functions on the shower facilities should be clear in font and pattern.

(4) A glass mirror with adjustable Angle and height should be set, and a defogging mirror should be used to avoid water mist covering the mirror. Adjust the Angle and height can be convenient for the elderly to use, such as for the elderly in wheelchairs to reduce the height, etc., the scope of the mirror can be freely adjusted according to needs.

(5) On sanitary ware, due to the elderly's mobility and memory decline, it is necessary to choose sanitary ware with self-control and easy to operate. The height of the toilet used by the elderly is about 430mm, and the elderly in wheelchairs need a height of 500mm. Smart toilets can be installed according to the budget, such as warm water air drying toilets, to provide help for the elderly with poor self-care ability. The color selection of sanitary ware can choose white, which is cleaner for the elderly, and can also better distinguish the color of stains and excrement. A hand box should be set next to the toilet for easy access, and another one can be set as a spare. The height of the hand box is 750mm.

(6) A constant temperature faucet with induction automatic temperature control can be set. In terms of water flow size, the flow rate should be small, the flow control is convenient, the water saving type and the low noise characteristics should be selected. The shower room should be set up bath bullies to ensure that the temperature change is smaller when the elderly take a bath, and it is convenient for the elderly to use. Northern regions can design heating with the function of bath towel rack, and set the heating position reasonably to avoid the hard shape of heating and scratching the elderly.

(7) If the bathtub is set in the bathroom, the depth of the bathtub shall not be greater than 500mm, the length shall not be greater than 1500mm, and the bottom of the bathtub shall be flat and not slippery.

(8) The bathroom is a high-risk place for the elderly to fall, considering that the elderly are prone to sudden situations, intelligent emergency call facilities can be set up in the bathroom, and the public bathroom is different from the facility can be connected with the elderly's family mobile phone equipment, can notify the family in an emergency to take corresponding countermeasures.

### 3. Anti-skid anti-collision design of the toilet

(1) The building ground suitable for the elderly needs to be not easily broken, wear-resistant, non-slip and smooth. In addition, the elderly living on the building ground should avoid anti-tide phenomenon, you can apply moisture-proof agents on the floor, lay moisture-proof film to avoid moisture caused by expansion, deformation, mildew and other problems, extend the life of the floor while improving the living environment of the elderly. The bathroom wall also needs to use waterproof materials, the interior can be laid waterproof coating.

(2) The bathroom wall should avoid Yang Angle and protrusion as far as possible, and the hard surface of all sharp corners such as the toilet table should be treated with anti-collision treatment, such as transforming into rounded corners, which is conducive to ensuring the safety of the elderly when passing and avoiding the bump of the wheelchair and other walking equipment, and preventing the elderly from aggravating the injury degree when falling down, such as knocking on the head and other important parts causing irreversible consequences.

(3) The door of the bathroom and shower room should not be set up inconvenient access to the threshold, to prevent the elderly from lifting legs and falling down, can be designed to smooth the ground and other height difference for sewer drainage. Different color warning strips can be set at the start and end, and safety warning signs and lighting tips can be set on the nearby wall.

### 4. Toilet circuit renovation design

Most of the old communities have circuit aging, circuit irregularity, and the use of high-power electrical appliances often have excessive circuit load, resulting in tripping, which has a great impact on the safety of the elderly. Therefore, when reinstalling the circuit, it is necessary to consider the safety of the electricity in the bathroom to ensure that the hot and cold water pipes form a series to avoid security risks. Safety power sockets should be used to ensure the safety of electricity for the elderly and reduce the risk of electric shock. The height of the power socket is determined according to the height of the user, such as the elderly in wheelchairs are set according to the height of their convenient operation.

### 5. Bathroom lighting design

(1) Natural lighting design: the bathroom should be as open as possible to ensure natural lighting, on the one hand, increase daylight during the day, reduce dark and damp, to ensure the cleanliness of the bathroom; On the other hand, the elderly's ability to adapt to light and dark is weakened, reducing the bump caused by lighting factors, causing inconvenience to the life of the elderly.

(2) Lighting facilities design: bathroom lighting in the design can be bright dazzling light source with anti-glare hood for appropriate shading treatment, in order to ensure uniform lighting, can be added to the wall near the ground auxiliary lighting. In the color of light selection, research shows that the elderly prefer warm and comfortable warm color light source. With the progress and development of

science and technology, AI intelligent LED lights gradually reveal a unique advantage, due to the elderly's vision decline, the voice control technology can be used to control the light switch and adjust the brightness and color of the light, which can better facilitate the elderly to use the bathroom in the case of dim and fuzzy vision.

#### 6. Toilet ventilation design

Bathroom ventilation can produce air convection to avoid the growth of bacteria in the humid environment of the bathroom. The bathroom suitable for the elderly should have open Windows, and the sunlight in the bathroom during the day can play the role of ultraviolet disinfection. If there is no open window in the original position of the toilet when the renovation is done, mechanical ventilation can be selected to reduce the odor of the toilet.

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