The Proposals for Design of Humanized Public Toilet

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Abstract

Public toilet are facilities we use everyday, but it seems to be thought of as dirty, smelly, and unsafe. How to eliminate this kind of image is of key importance, it deserves everyone’s concern and effort to amend such problem. The design priority for public toilet is humanization - it has to be designed with the need of user’s behavior. Secondly, the brightness, good ventilation and safety are important as well. Thirdly, it should be easy to clean and maintain. According to this understanding and based on my previous personal experiences of toilet designs, I would be glad to present this information to the benefit of our “toilet family” as a whole in the hope that it will meet with overwhelming support.

Keywords

Humanization; Safe and comfortable; Toilet behavior of disabled people; Dressing platform for ladies.

1 Introduction

Public toilets are places that everyone must use everyday; the distinction of toilet design is an issue of concern. Does it accord with our daily behavior of use or whether it is easy to clean? Taipei began to promote cleaning programs since 2000. In recent years, department stores, cinemas, restaurants, stations, markets, parks, schools, and all administrative units have dedicated their utmost efforts to work on the cleanliness. The city implemented new plans as well, that really did make some noticeable improvement in public toilets. However, in the design of public toilets there remain a lot of problems waiting to be improved. In the following we will present some examples and discussion:
2 Design of toilet used by disabled people

Most of the designs for toilets used by physically disable people do not meet the needs of users. This is often because the designer did not understand the way in which disabled people use the toilet, and rarely have a chance to accompany them to go to toilet. Therefore, they always refer to existing information and simply copy old designs with little evolution or modifications. This is a mistake that should not be made. There are few criteria that we have to pay more attention to:

(1) The door width for disable toilet should be 90 cm, preferably equipped with light manual sliding door that should not have threshold and must level with ground level. Electronic door is apt to suffer from power failure or breakdowns, making most of disabled people afraid of being locked inside.

(2) The disabled toilet shall have a net turn-around space with a diameter of 150 cm to allow for a wheel chair to make a U-turn.

(3) Disabled people sit on the wheelchair most of the time, so insufficient muscle movement often causes peristalsis of the intestines. Therefore, most suffer from excretion difficulties and constipation, they have to assist the feces out with their hands or use an enema, thus making both hands dirty and unable to wear trousers. Consequently, a small washbasin is needed to fix next to the wall beside the disabled water closet. (Photo 1)

![Photo 1 - The disabled toilet with a backrest without water tank. A small washbasin next to it, the width of two handles is 70 cm and height of 65 cm. (228 Park in Taipei)](image)

(4) The water closet should provide a backrest without seat cover. The height of the water closet should be 40 cm.

(5) Handles are to assist the disabled person in using the toilet, two handles beside the toilet seat give support for disabled people taking off their trousers, so the height should be 63~65 cm, and a width distance of 67~70 cm to facilitate use. One of the
suspended handles should be moveable and easy to turn, the other sidewall’s handle should be L-shaped (preferably length of each handle is 80 cm)

(6) The disable toilet does not need a water tank. It is better to provide a pressure flush with a flush button must not set behind the toilet seat, but instead placed it should be easy to reach and place on top of the small washbasin (height is 120 cm). Next to flush button, an emergency bell should be provided. Lastly, a toilet paper holder can be placed beside the small washbasin.

(7) Because the disabled person sits on a wheelchair, they use urine pot or a catheter to urinate, so the sidewall next to L-shaped handle should provide another set of flushing buttons, toilet paper holder and emergency bell. (Figure 1). They can press the flush button while sitting in the wheelchair.

![Figure 1 - A disabled toilet with small washbasin next to the water closet, 2 sets of flush button, emergency bell, and paper holders should be provided.](image)

(8) Minimum dimensions of the disabled toilet and its entrance-appliance relationship are detailed in figure 2. The required space for a disabled toilet varies with respect to manual and powered wheelchairs. The basic layout of the water closet and washbasin, and their relationship with the entrance shall be as indicated in figure 2.
3 Multi-functional disabled toilet

The facility and related costs of a disabled toilet are very high, yet the usage frequency of most disabled toilets is extremely low. Recently, in order to increase the disabled toilet usage frequency, there was an international trend of incorporating baby toilet, baby chairs, diaper tables, artificial-anus feces lavatories etc. into a disabled toilet so that it becomes multi-functional; it is no longer a disabled toilet only but a parent-child-toilet and an artificial-anus-toilet as well so that its usage is expanded. This configuration has been termed the “Multi-use Toilet” or “Universal Toilet”.

A disabled toilet can incorporate a variety of facilities to become a universal one:

(1) Diaper Table (baby bed)
(2) Baby Chair.
(3) Child’s water closet or urinal.
(4) Artificial anus feces lavatory – A feces lavatory can be added to a disabled toilet for the use of Ostomates or artificial bladder users; this lavatory is preferably fit with a detachable warm water rinse faucet on top of it. Additionally, there should be a flip-open trashcan for disposing used urinal bags. A dressing mirror and some hangers shall be installed on the wall. (Figure 4)
(5) Dressing platform for women – if a women’s menstrual period comes when she is shopping in a department store or in a park, it is very inconvenient if they change their clothes in a water closet compartment. A detachable platform of size 60×60 cm on a wall (under Baby Bed) in a disabled toilet would be preferable for them to lock up the disable toilet door and change clothes privately. A specific changing room is equally preferable, but must be equipped with a basin. (Photo 2 & Figure 6)

4 The design of squatting type toilets

Toilets can be separated into two main categories, “squatting” type toilet (also called Japanese toilet), and “sitting” type toilet (also called Western toilet). In the distribution
of toilets in the world we can take Turkey as a boundary. To the east of Turkey toilets are mainly of the squatting type. To the west of Turkey they are of the sitting type. The squatting type make up the great majority of public toilets in Taiwan, because of the general unsanitary feeling about direct contact with toilet seat, so most of them only provide one sitting toilet in public toilets. The design of squatting type toilets still has a lot of problems that need to be improved:

(1) For the design layout of squatting type toilets, it is advisable to design them parallel level with the door. That is to say the door is on your right or left hand side while squatting. Most of people feel insecure if their buttocks are toward the door when someone knocks the door.

(2) Squatting type water closet’s dimension usually is 1 meter × 1 meter, due to cleaning consideration, it is advisable that the width should be more than 1 meter. The length is 1.10 ~ 1.20 meter.

(3) In Taiwan, the general size of squatting type water closet is 50 cm, which is so short that the excrement can often be found outside of toilet basin, causing cleaning problems. Therefore, we have especially developed a long squatting type of 70 cm. (Photo 3) The 4 angels of the edge were made in square shape, it is much easier to fix with ceramic tiles into floor than the previous round shape, and is neat, and easy to clean.

(4) Using 70 cm extended squatting water closet, furnished with inverted T-shaped Handle as Photo 3. It can support the users not only to help maintain balance when squatting down or standing up, but also to help users to get in the right position to prevent excreting outside of the toilet basin.

(5) Toilet basin into the floor deck, so it causes a 20 cm step difference between toilet and floor. The step barrier makes it easy for elderly people, children, and pregnant women to fall. It is more advisable to make the design flat without a step barrier. (Figure 5)
5 Adding Safety to ladies toilet’s facilities

The first priority in design for ladies toilet is to ensure “safety” and “privacy.” The entrance should be designed as a curved walkway without a door, that can not be seen easily from outside. In recent years, the ladies toilets have been designed with more humanized consideration, such as:

(1) The gap distance for squatting type toilet should be no more than 3~5 cm from the floor to toilet door to ensure privacy. The top of each toilet should be provided with a bright lamp and place with emergency bell to increase security.
(2) The ladies toilets should be more spacious and additional powder/makeup corner.
(3) It is preferable to provide a room with toilet, dressing platform and water basin. (Figure 6) This will provide a private, safe room for women to change their underwear with ease during menstrual periods, and with a cleaning platform (movable), washbasin.
The quantity problem of toilets for men and women have long been neglected. Usually female require longer time than male in using toilet, according to the investigation of TOTO Technical Center, Japanese female’s urinating duration in average is 90~93 sec whereas male’s is about 30~35 sec, the proportion of time necessary between male and female are 3 times difference. In Taiwan, based on my study – most women are 70~73 sec, and men are 30~35 sec. Why Japanese women require longer time of toileting, because they are usually shy of their urinating noise being heard by others, they would flush water before use and flush again for actually urinating, so the actual urinating sound would be covered by water flush noise, then they would finally flush third time after putting their clothes back, totally take 90~93 sec. In Taiwan, the proportion of usage time for men and women are 1:2; basically when come to design of public toilet quantity, the female require one time more than male. But in place like schools, movie theatres, stations, concert halls, theatres and conference rooms where people rush to toilet during the “simultaneous” period, the number of male and female urinal sets should be “1:2” or ”1:2.2.” However if there would not be a high probability of simultaneous use for toilets in park and department store, it would not be necessary to follow the proportion of “1:1.2” or “1:1.5.”(Table 1)

<table>
<thead>
<tr>
<th>Gender</th>
<th>Time require for urinating</th>
<th>Ratio of time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>Female 90~93 Sec</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Male 30~35 Sec</td>
<td>1</td>
</tr>
<tr>
<td>Taiwan</td>
<td>Female 70~73 Sec</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Male 30~35 Sec</td>
<td>1</td>
</tr>
</tbody>
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Note : Japanese female waste too much water when urinating. TOTO has developed a device called "Otohime" (Imitation sound unit) that releases water flushing noise to replace actual flushing.

6 The Problem of Urine Residue on Men’s Toilets

The most serious problem of keeping public toilets clean is the urine residue problem which cause the terrible smell under urine bowls in men’s toilets, it is difficult to clean
urine drop on the floor. In the design plan, we tried to apply some countermeasures to prevent the problem. (Photo 5)

(1) Hanging type urinal sets should be installed (the floor type is not easy to clean), the height of urinal sets opening is 60~65 cm. In most European countries are 65~70 cm, Japan is 58 cm, a slightly increase in height will make urination into the urine set that much easier.

(2) Place a fluorescent light above the urinal set will enable the users to get closer. If the lights are placed in middle of the room, our own reflecting shadow will cover the urinal set and cause vision to be somewhat blurred. This cause people to resist stepping closer to the urinal set and also are afraid of getting dirty on their pants.

(3) Pave a 50 cm-wide black granite stone band right under the urinal sets, with 1 ~ 1.5 cm slightly higher than the floor for the user to stand on. This can reduce the problem of urine drop and be easy to clean. A large ceramic board can also be used. If using small size of floor tiles, dirt can easily hide in the cracks, causing a smelly problem.

(4) There should be a piping wall for urinal sets with a thickness of 15~20 cm, height of 140 cm. Additionally, a marble stone should be placed on top of it, offering a place to put handbag or flower pots.

(5) The distance between each urinal set should not be less than 80 cm. If users get too closer to urinal set, it will easily cause a dripping problem on the floor.

(6) It is preferable to use the projecting window on top of urinal sets, it provides a good view for user to step closer and good ventilation.

7 Conclusion

Dealing with the treatment of excretion, different ethnicities have different methods of handling it. The public toilet in different locals such as mountains, rural areas, or beside rivers, all proceed with different ways of design. The above suggestions are designed for a developed city well equipped with water and electricity. Public toilet have always
been criticized as a scourge of society, they are dirty, dark, smelly, frightening and run-down. How to upgrade the standard of public toilets, and provide a bright, comfortable humanized toilet environment is everybody’s concern.

Humanization is considered primarily when designing a public toilet. A thoughtful design will make the user feel comfortable and convenient. Certainly, it must also consider the ease of cleaning when determining size of space and material selection. Especially selecting suitable size of tiles to fit into the floor and wall at a toilet is very important. The floor tile must be easy to clean and nonslip. If using face tile as material, the tile pattern integration have to be made, for example we employed the face tile of $19.8 \text{ cm} \times 19.8 \text{ cm}$ at the public toilet of 228 Park, so we can use 20 cm multiple space to avoid cutting on tiles, it can avert hiding the dirt on the joint. Finally, I am glad to have this opportunity to offer these few proposals for everybody’s reference. Of course, there still remain a lot of problems that must be paid attention to, such as the ventilation, no door entrance, the tool room facilities, the establishment of septic tank, the maintenance problems and the measures of water & energy saving, etc. I wish to have a chance to discuss these more at some other time.

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9 Presentation of Author

Frank, Ming Hsiu Wu architect is the honorable chairman of Taiwan Toilet Association. He has been involved in studying, from architectural designing to architectural planning for more than four decades. He was appointed to the professor in the department of architecture of Kyushu Sangyo University, Japan, between 1991 and 1993.

More recently, he has been promoting to study the relationship of man and environment from the angle of environmental psychology, as well as designing humanized architectures and environment based on analysis of human behaviors.

1996- Awarded for second R.O.C Outstanding Architects Award
1999- Awarded for Far Eastern Architectural Design Award
2002- Designed the No. 1.2.3. public toilet of Yang-Min Mountain Park (Humanized toilets)
2004- Designed the public toilet of Taiwan History Museum. (At 228 Park)
2005- Designed and reformed ten toilets along Muzha Line in Taipei M.R.T