

Guidelines for Design and Management of Public Toilets in Hong Kong

HONG KONG TOILET ASSOCIATION

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Content

1) Introduction	3
2) Designing and Building a Good Quality Public Toilet	5
3) Public Toilet Management	24
4) Education	29
I. Appendix	31
II. References	33

1) Introduction

Public toilets are essential for most people when they are ‘away from home’¹. They are extraordinarily important for the elderly and disabled and for families with children as these groups of people require access to clean and hygienic public toilets. The impacts of isolation from public toilets for this group of people are great and can bring about social and medical problems.

Hong Kong is a metropolitan city with excellent city structures and it is a popular destination for the tourist industry, which is a pillar that supports the local economy. Therefore, good quality public toilets can bring tremendous economic benefits to the government and enhance the public image of Hong Kong globally. These guidelines are an overview of developing and maintaining the quality of the city’s public toilets to safeguard public health, hygiene and safety in the community, as well as serving the many tourists and visitors.

The public toilets provided in Hong Kong are generally categorised as follows:

- 1.1 Toilets built and managed by the government which are located in parks, tourist spots, playgrounds, musical halls, public transportation termini and markets.
- 1.2 Communal toilets in shopping malls operated and managed by the private sector (developers or shop operators).
- 1.3 Toilets attached to premises selling food, such as restaurants, bars and fast food chains.

1.4 Toilets provided for ad-hoc activities, such as at public events and markets, and public toilets offered on a temporary basis.

The public toilets provided by the government mostly operate on a 24-hour basis, except where they are in markets in government premises and at recreational and cultural services department events. The communal toilets in shopping malls are generally closed before midnight. The public toilets that are open for 24 hours are important because some users have different shift patterns, such as public transport operators, including taxi and truck drivers, and medical care providers, such as nurses. Hygienic and clean public toilets are essential to provide convenience to all of the stakeholders.

A set of guidelines was established based on the Comfort, Accessibility, Safety and Hygiene (CASH) concept which was first initiated by Professor M. Siu, the first president and one of the founder members of the Hong Kong Toilet Association (Professor Kin Wai Michael Siu, Poly-University, 2006²). The guidelines stress that management and education also play significant roles in a good quality strategy, and they were further developed to include a Management and Education (CASH+ME) concept.

2) Designing and Building a Good Quality Public Toilet

The following recommendations have been adapted to encompass the CASH+ME initiative from a design perspective. The proposals are the collective ideas of public users, service providers, as well as professional advisers. These design proposals are economically affordable, durable and practical, and are for the benefit of the community to protect both people's well-being and public health. Public toilets currently give the impression of typically being 'dirty places full of unpleasant smells and other discomforts'. Users have no desire or patience to stay long in public toilets. However, if public toilets can be better designed and are accessible, safe and hygienic, the following design criteria should be considered for good quality public toilets in order to incorporate the CASH+ME strategy.

2.1 Comfort

Public toilets currently give the impression of being dirty, insufficiently lit, unpleasant smelling and unsafe. As a result, users are leaving the toilets immediately without flushing or washing their hands. To alleviate this poor situation, the following recommendations are provided in order to provide a more comfortable environment.

2.1.1 Unpleasant smells in public toilets can cause discomfort. An efficient ventilation system is the key element to improving the air quality in public toilets. For public toilets without natural ventilation, mechanical ventilation system should be installed to provide sufficient ventilation with a rate of at least ten air changes per hour. Additional exhaust ducts should be connected at the back of the toilet pans in the cubicles at a height of 100 mm higher than the top of the toilet bowl and a fresh air inlet should be fixed at approximately 1800mm above the toilet bowl.

2.1.2 Urinals become the source of odours when the urine is not disposed of immediately. Automatic motion sensor flushing devices are recommended to immediately dispose of urine when the user leaves the urinal. Auto-flushing cisterns are



not recommended because the urine remains in the urinal until the auto-cistern is fully replenished after the previous flush, which may require a couple of minutes or longer. For environmental protection, waterless urinals are an alternative because they don't require the flushing of water; however, frequent inspections are required to



check if the refill needs replenishing³.

2.1.3 A sound system with a moderate sound level (not more than 55 dBA) is suggested with light music (such as flowing water background music). The sound system can be activated by a sensor device and users will feel more comfortable and relaxed when they use the public toilet.

2.1.4 An audio system should be installed to remind the users to flush the toilet after use to eliminate unpleasant smells in the toilet.

2.1.5 It is suggested that plants should be placed in toilets to enhance them as green and pleasant environments.



2.1.6 A sizable litter bin with a foot pedal or electronic-sensor operated cover should be placed in each of the female toilet cubicles for the disposal of sanitary napkins and personal waste.



2.1.7 Coat hooks should be provided in all toilet cubicles for the convenience of hanging handbags and coats at an appropriate height and eyesight distance.



2.1.8 Baby feeding rooms are recommended to provide for either breast or bottle feeding. The room must be located in an enclosed area in the vicinity of the toilet, but a separate room is preferable with a chair and table. The room must also be appropriately ventilated.



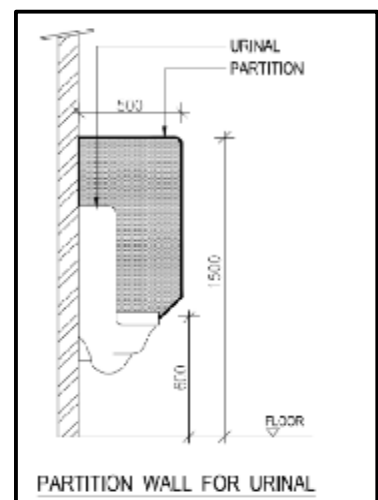
2.1.9 Clear signage to indicate if the toilets are seated or squatting toilets should be displayed on the door of the cubicles for the convenience of the users.



2.1.10 Where possible, waiting areas with benches to sit on should be provided for pregnant women and elderly people who may not be able to stand for too long when queuing up in the toilet area.



2.1.11 The social anxiety called ‘paruresis’, or shy bladder syndrome, where a person feels uncomfortable and lack of privacy urinating when people are standing close behind or nearby, is also experienced in public toilets⁴. Therefore, when designing urinals, sufficient space should be allowed on both sides and behind. It is recommended that the dividing board should be fixed from 1500mm high above floor level and 450 mm width. If possible, urinals should be located in isolated areas where less people traffic occurs.



2.1.12 ‘Parcopresis’, or shy bowel syndrome ⁵, where a person cannot comfortably defecate in the presence of other people, is also common. Therefore, partition walls between cubicles as high as the ceiling height (at least 2.5 meters high) are recommended. Both of the side partitions in the cubicles should have no gap to the next cubicle. For safety purposes, a minimum gap of approximately not more than 100 mm below the door is suggested.



2.1.13 Public toilets should be painted in bright colours in order to create a conducive and comfortable environment. The wall and floor tiles and lighting should harmoniously match the surrounding area.



2.1.14



Toilet paper should be supplied in all cubicles. Toilet paper dispensers with sensors should be installed, with the device being capable of informing the attendant when the paper is almost empty. Alternatively, dispensers with double-rolled toilet paper are another option, where the second roll of paper is

on standby when the first roll is consumed to ensure toilet paper runs out. Otherwise, people tend to use different types of paper (e.g. newspaper) for cleaning. Consequently, toilets can become blocked causing serious hygienic problems, especially during high consumption periods.



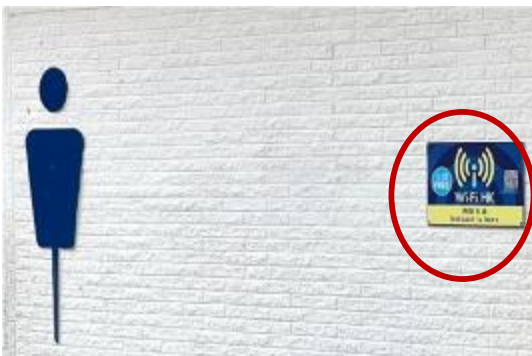
2.1.15 For the convenience and comfort of users, a shelf at a suitable height and size for personal belongings should be provided in male and female cubicles and for urinals in male toilets. The shelf should be fixed within eyesight distance to prevent theft.



2.1.16 A baby diaper changing table should be provided in male and female toilets.



2.1.17 Toilets are not only places for personal needs as they are also used for other business, such as Ladies may also spend a few moments on their make-up where a mini-powder room is available.



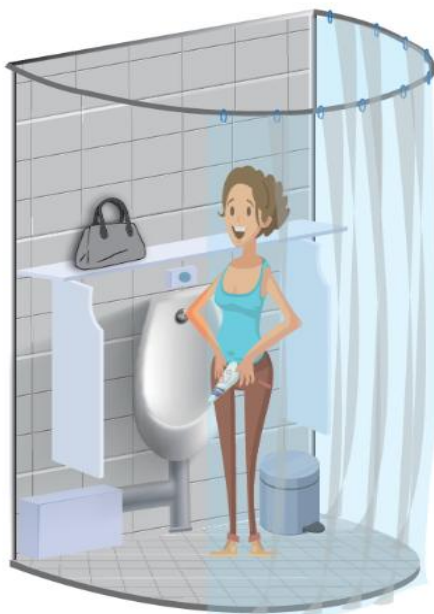
2.1.18 At present, mobile phones are used nearly everywhere and USB charging and wifi facilities in public toilets would provide an extra convenience.

2.2 Accessibility

Accessibility to a clean and hygienic public toilet can become an increasing concern, especially for disabled and elderly people, families with small children or for pregnant

women. This group of people can become isolated and hesitant to leave their homes because they cannot gain access to a clean public toilet with facilities that they expect. Thus, the following recommendations are proposed to improve accessibility to good quality public toilets.

2.2.1 Women often have to queue to gain access to public toilets, especially when special functions and large conferences and events are taking place. Under the



current regulations, the ratio of male to female toilets is 1:2⁵. However, this ratio



does not include the urinals in the male toilets. Many studies have shown that the duration of toilet use by females is approximately double that of males⁶. Therefore, the current ratio of 1:2

should include the urinals in male toilet. For example, if a male toilet consists of three water closets and three urinals, then the female toilet should consist of 12 water closets. In existing toilets, adding extra toilet cubicles in female toilets can be difficult, and female urinals are an option.



‘Stand and pee’ with the aid of a special design funnel can enable women to stand and urinate similarly to men, thereby allowing accessibility to a toilet and shortening the queuing time during high consumption periods.

2.2.2 As the life expectancy of the population become higher, elderly people will increasingly not be able to go out unless they can gain access to public toilets. Access is especially required by those who suffer from different types of chronic conditions, such as ostomates (a surgical operation for the discharge of body waste), incontinence, urgency and prostate problems, and those requiring a diaper change or special care facilities. Therefore, a folding bed for changing is required in a room with a locking device. This special room is recommended for public toilets in major districts.

2.2.3 The government encourages people to take public transport as much as they can, however travelling by public transport without public



toilet facilities is a serious concern for most people. Thus, public



toilets should be provided at public transport stations, such as at those of the MTR, as well as at major bus termini and at ferries to different islands.

2.2.4



At least one baby seat with a safety seat belt should be installed in the cubicles in male and female toilets so that infants and small children can be looked after when the adult companion is using the

toilet. Toilet cubicles with this facility should be slightly enlarged with signage displayed on the cubicle doors.



2.2.5 Family toilets with sanitary facilities for adults and children who need a diaper changing table is an alternative design which will provide great convenience to families with small children.



2.2.6 Boys who are below 5 years old boy or are less than 1 meter tall often cannot go to the male toilet alone. Therefore, a urinal for children should be provided in the female toilet with a partition panel.

2.2.7 Signs indicating sitting or squatting toilets should be displayed on the doors of the cubicles to allow the users to choose their preference without having to open the doors, thereby saving time especially during busy hours.



2.2.8 Visible and clear signs showing the locations of public toilets should be displayed for easy accessibility. Direction signs should be posted on the streets within a one-mile radius of the designated toilet. Information such as the exact locations of public toilets, their opening hours and the availability of facilities for those with special needs should be easily available on the internet and websites. Information should also be promoted in travel leaflets



2.2.9 At the entrances of public toilets, the appropriate 'Male' and 'Female' signs should be provided in an easily recognizable design and appropriate size.



2.2.10 Baby diaper changing facilities (bench) should be provided in both female and male toilets.



2.2.11 At least one urinal should be provided for children in a public toilet.



2.2.12 Disabled individuals should have access to all public toilets, including step-free access from the street level to the toilet.



Disabled persons not only refers to the elderly and persons with difficulties in walking, but also to those with poor eyesight and hearing problems. Guiding paths with handrails and Braille instructions should be provided for visually impaired persons. Mixed gender public toilets should be provided for those who need them, especially for disabled elderly people.



2.3 Safety

Safety considerations are vitally important for public toilets as they are environments where there is not only a high risk of transmitting viruses, but they are also where potential accidents to users occur, especially when they are inappropriately designed or managed. The following recommendations are suggested to ensure the safety of public toilets.

2.3.1



All pipelines and cables should be installed in a concealed manner. Corners with sharp angles or edges should be avoided. Opening on pipelines and access panel should be provided for maintenance purposes.

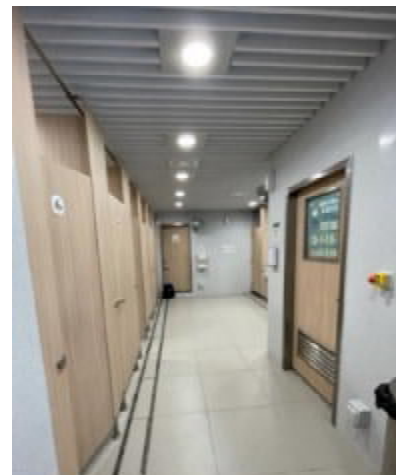
2.3.2 For safety and privacy, mirrors should not be installed in a position where the users in the toilet are reflected. In the individual toilet cubicles, lights indicating occupancy are recommended. When the cubicle is in use, a red light should be ON, signifying that the cubicle is occupied. Likewise, a green light should be turned ON signifying that the cubicle is vaca



2.3.3 When a squatting toilet pan is installed, handrails must be provided. In addition, at least one urinal should be provided with a grab bar for elderly or disabled users.



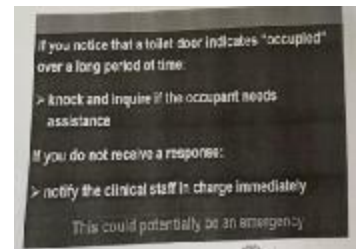
2.3.4 Insufficient lighting produces unsafe feelings in users. Therefore, ambient lighting should be provided at not less than 300 lux.



2.3.5 Cleaning equipment and tools such as brooms, buckets and cleaning agents should be appropriately stored in the attendant's room to avoid accidents.



2.3.6 'Safety check' procedures should be set (at least hourly) in public toilets to monitor the safety of people who may be unwell or need clinical assistance⁷.



2.3.7 A design concept of 4-in-1 in public toilets is strongly recommended. The concept involves installing an auto-sensor water tap, auto-sensor liquid soap dispenser and auto-sensor hand dryer or paper towel dispenser in the one area. The hand dryer will blow water from the hands directly into the basin. The advantage of this design is to minimize the chances of wet hands causing slippery floors, which is unsafe. It also minimizes people traffic within the toilet area.



2.3.8 Emergency call buttons must be installed in disabled toilets and be connected to the health care system outside of office hours.



2.4 Hygiene

Hygiene should be put on top of the list when designing and building high quality public toilets. The following guidance provides a framework for protecting the public and identifying the hygiene issues arising in public toilets, where the transmission of viruses is an important concern.

2.4.1 Germs may lurk on the surfaces of the walls, door handles and knobs. When users touch these areas, viruses can be transferred to the next user. Therefore, a touchless concept should be deployed starting from the entrance to the toilet. The main entrance of a toilet should preferably be door-less with off-set entrance design.



2.4.2 All pipelines (drainage and water supply pipes) connecting to the sanitary appliances should be fixed and concealed in walls or floors to avoid dirt from being trapped between the walls and the pipes, which are also difficult to clean and nurture germs.



Suitable rodding eyes should be provided where the pipes change direction for easy cleaning and maintenance when blockages occur.



2.4.3 Sufficient ventilation reduces the chances of foul air and viruses in a room. Therefore, the mechanical ventilation system in public toilets is expected to achieve a rate of at least ten air changes per hour.



2.4.4



after washing.

All taps for the wash hand basins should have electronic sensors. An electronic sensor soap dispenser should be fixed near the basin. A fast hand dryer is preferable instead of paper towels for drying hands after washing. An opening for a rubbish bin under the counter top is ideal for users to minimize the chances of wetting the floor while their hands are wet

2.4.5 Foul air detectors should be installed. When foul air is detected, immediate action should be taken to identify the problem and rectify it as soon as possible.



2.4.6 Studies have articulated that aerosol particles containing viruses can be induced from the toilet bowl and transmitted to users during the flushing of a toilet (Li et al., 2020)⁸. Therefore, signage to advise users to flip down the toilet seat cover before flushing is strongly recommended⁹, as well as for the squatting toilet pans. Such signs should be placed in a conspicuous space.



2.4.7 The floors and walls of public toilets must be fully tiled and the materials should be water repellent with non-slippery surfaces and larger sizes to avoid germs between the joints of the floors and walls. Colourful ceramic or glazed wall tiles are recommended to make the place shiny and bright.



2.4.8 U-shaped toilet seats¹⁰ are recommended for hygienic purposes which allows a space to avoid contacting the seat with our genitals or hands, especially for women which allows them to wipe the perineal area after urinating. This is a standard requirement which was included in the American Standard Nation Plumbing Code in 1955 and the Uniform Plumbing Code in 1973.



2.4.9



In some tourist areas, the users of the public toilets are from different parts of the world, with different religions, and they do not use paper towels to clean. Thus, at least one water tap with a shower jet is recommended inside the cubicles of male and female toilets.

2.4.10 Litterbins with covers should be provided in all cubicles, especially in female toilets for sanitary napkins and waste. The covers should be operated by foot pedal or electronic motion sensor to avoid direct contact with hands.



2.4.11 Users hesitate to sit on the toilet seats in public toilets and they may squat on the closet bowl. This practice is very dangerous, and casualties have been reported. Therefore, liquid toilet seat sanitisers with a standby bottle should be provided in the toilet cubicles to not only enhance hygienic concerns, but to also prevent users from consuming layers of toilet paper to cover the entire toilet seat.



3) Public Toilet Management

Toilet management aims to provide quality services to users¹¹. A comprehensive strategic plan should be set for the overall management of the toilet. Substantial resources are needed to maintain the facilities in good working condition. The scope of the work is demonstrated as follows:

3.1 Cleaning toilet facilities

- 3.1.1 A cleaning schedule must be implemented on a daily, weekly or monthly basis depending on the nature and frequency of toilet usage. The schedule should also consider a time frame which will not cause inconvenience to public users. The cleaning frequency should be higher for high traffic toilets such as those in tourist areas or shopping malls, compared to those for office or school toilets.
- 3.1.2 Professional approved cleaning agents should be used for different facilities to prevent damages to the sanitary wares and fittings and other equipment such as chrome-plated or stainless-steel taps, electric hand dryers, floor and wall tiles and mirrors.
- 3.1.3 For large equipment such as the mechanical ventilation systems, professional engineers and technicians should be engaged to routinely check and clean the moving parts, particularly the filtration systems to keep the air quality up to standard.
- 3.1.4 Safety measures must be taken during cleaning of the public toilets, and the following steps should be followed:
 - 3.1.4.1 Display the safety cleaning signage prior to commencing cleaning work.

- 3.1.4.2 Properly clean the inside and exterior of all sanitary wares such as toilet bowl, basin, taps and counter-top areas.
 - 3.1.4.3 Properly clean the walls and floors of toilet cubicles.
 - 3.1.4.4 Thoroughly clean the urinal bowls or urinal trough.
 - 3.1.4.5 Dry the floor of the entire toilet area after cleaning with a mop and blow dry it with a portable high-speed fan to avoid a slippery floor.
 - 3.1.4.6 Remove the grating cover near the urinal (if installed) and thoroughly clean the cover and the channel.
- 3.1.5 Check and refill all hand washing liquid dispensers and replace the toilet paper rolls and paper towels if found insufficient.
- 3.1.6 Record all consumables on the record sheet and report any defects or shortage of consumables to the engineering department.

3.2 Maintenance of toilet facilities (repair and replacement)

3.2.1 Defective facilities must be labelled and covered by protective materials for safety. The occurrence must be recorded and reported to the management immediately. Routine inspection of the toilet facilities such as the water cistern, sensor flushing valves for the water closet, wash-hand basin or urinals should be performed weekly or monthly depending on the nature of facilities and the operating sequence of the system.



3.2.2 All cleaning agents should be environmentally friendly and approved by the management. The agents must be properly labelled and kept in storage areas according to the manufacturers' instructions.

3.3 Training

3.3.1 Training of toilet attendants and supervisors is necessary to maintain the sanitation and safety standards of public toilets. Therefore, qualified toilet supervisors and attendants should be engaged, and this feature should be part of the terms and conditions required for qualified cleaning contractors. The contracting company should be a qualified body in compliance with the International Organization for Standardization (ISO) standard.

3.4 Contract review

3.4.1 Outsourcing the cleaning work is an alternative way of managing the public toilet. For such a case, the contract terms should be reviewed periodically to ensure that the terms and conditions are fully implemented and observed. Frequent scheduled or ad-hoc inspections will maintain the effectiveness of the contractual work and alert the contractor to sustain the quality of their service.

3.4.2 A well-designed log book must be placed under lock and key in the public toilet so that the inspector can check the facility at any time. To ensure the compliance of the contracting company with the requirement of cleaning toilets, a key performance index system should be deployed to monitor the performance of the contracting company or the individual body engaged in the maintenance of the public toilet.

3.5 Well-being of the toilet attendant

3.5.1 Public toilets must be properly maintained and supervised. Toilet attendants play a key role in keeping the toilets clean and hygienic. Appropriate areas should be provided for the toilet attendants. A suggested area of not less than six square metres should be provided for a male and female attendant, and the space should be expanded accordingly if more attendants are needed. The room should be properly

ventilated with ambient lighting and a sizable storage area for consumables such as toilet tissues, sanitizers or liquid soap for the dispenser. A slop sink should be provided for washing the mops and cleaning clothes.

3.5.2 All toilet attendants must wear clean uniforms for identification. Training should be provided to the toilet attendants and certificates issued by a professional body.

3.6 Check list and record

3.6.1 A comprehensive record must be kept by the toilet attendant. The toilet supervisor will inspect the toilet and sign on the record book on specific time zones. Ad-hoc inspection will be conducted to ensure that the cleaning work is done as specified at any time. The record sheets/books must be kept under lock and key. The content will include the following items:

3.6.1.1 Sequence of cleaning

3.6.1.2 Cleaning time

3.6.1.3 Defective fittings such as those for flushing valves, water taps and other sanitary flaws

3.6.1.4 Blockage of toilet bowls, basins and hand-dryers

3.6.2 Consumable items

3.6.2.1 Toilet papers/towels and sanitizers

3.6.2.2 Mop and bucket

3.6.2.3 Broom

3.6.2.4 Detergent (environmentally friendly type)

3.6.2.5 Disinfection/bleaching fluid

3.6.2.6 Rubber gloves

3.6.2.7 Washing clothes

3.6.2.8 Toilet brush

3.6.2.9 Toilet plunger

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3.6.3 Equipment

3.6.3.1 Portable high-power blower (optional for drying wet floors)

4) Education

A well designed and built toilet becomes clustered if the infrastructure is inappropriately maintained and used by the public. Thus, educating the users on the use of toilet facilities is vitally important. From the designer's perspective, the concept of user-friendly and durable materials influences the user's behaviour in the long term. For example, a clean and user-friendly toilet is always better than a toilet without hygiene and safety.

With the provision of toilet facilities, educational materials should be simple and clear in bilanguage (Chinese and English). Colourful and eye-catching posters should be fixed in a display box or framed poster to avoid graffiti at the conspicuous position in the toilet. Audio educational messages with light music can be broadcasted in the toilet. Motion sensors may also be deployed to activate the system when entering the toilet, reminding them to appropriately use the toilet facilities, such as to keep the toilet clean and hygienic, dispose wastes into the bin, keep the floor dry by not flicking water onto the floor after washing hands, flush the toilet after use and lower the toilet seat and cover after use before flushing. Adhesive sticker can be used for male urinal, advising users to aim at the urinal and not spill out of the stall. Additional signage can be placed during the pandemic, such as the Covid-19, which requires special care, such as social distancing and wearing of mask even in the toilet. 'No Smoking' sign should be placed. Clean the toilet after use for the next user.

Clean Toilet Campaign

The government as well as the voluntary organisations should disseminate the information that clean and hygienic public toilet is key to public health and good image of a metropolitan city such as Hong Kong. Education should start from the preschool level to high level with yearly 'Clean HK Toilet Campaign'. Private sectors, such as shopping

malls, are invited to join the campaign. A team of cleaners recruited from school or voluntary organizations should be deployed yearly to inspect the public toilets and reach out to the public that appropriate use of public toilets does not only promote the image of Hong Kong, but also maintains public toilet hygiene.

I. Appendix

A. Installation of Facilities in Public Toilets

- a. Water-saving devices should be considered in all public toilets for energy saving and environment protection. Materials should be durable, easy to maintain and resistant to vandalism¹².
- b. In echo to environmental issues, low-capacity flushing cistern is recommended for toilet flushing. Waterless urinals are also recommended to save water. All water taps should be low flow in compliance with waterworks supply department (WSD) water saving scheme¹³.
- c. The name of the cleaning attendant and record should be clearly displayed, as well as the cleaning company/agency.
- d. A designated room with appropriate ventilation (fan or air-conditioned) should be provided for the attendant to rest and complete their meals. A slop sink should be installed for the attendant to wash the cleaning utensils.
- e. All pipe works should be carried out by licensed plumbers. Drainage works should be performed by building contractors registered by building department.
- f. All plumbing works must comply with building (standards of sanitary fitments, plumbing, drainage works and latrines) regulations, as well as regulations set by WSD.¹⁴

B. Pros and cons of toilet facilities

No.	Description	Pros	Cons
1	Automatic flushing system for urinal	1. Constant flushing the urinal.	Waste of flushing water. Flushing will be performed when the water level is reached to a certain level and the syphon will be activated to allow water to flush on a cycle preset by the management. The system will be working around the clock whether there is any user.
		2. Lower cost of investment.	
		3. Easy to repair in case of malfunction.	
2	Auto-sensor type water tap	Touchless operation which reduces chances of virus infection which is good for hygienic concern.	1. Higher material cost (electronic devices and wiring cost).
			2. Higher maintenance cost.
3	Squatting toilet	1. Less chance to contact the toilet bowl.	1. Difficult to stand up after use, especially for elderly people.
		2. Easier to clean than pedestal toilet bowl.	
		3. Cultural need as most Asian people prefer to squat when defecate in toilet.	2. Most squatting toilets come with no cover causing virus transmission when the toilet is flushed.
4	Scupper channel with drain and grating	Collect water from floor surface to the channel and drain away so that the floor will not be wetted and slippery.	Virus will stay in the scupper channel and grating unless it is washed and cleaned thoroughly at least every hour. If the traffic is high the frequency of cleaning should be increased.
5	Air refreshener	To cover the bad smell in the toilet area.	The spray may contain VOC (volatile organic compound) which affects air quality and health as well as the ozone layer from the environmental perspective.

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