

Guidelines for Design and Management of Public Toilets in Hong Kong

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1) Introduction

Public toilets are crucial for many individuals when they are away from home. They are particularly important for the elderly, disabled, and families with children, as these groups require access to clean and hygienic public facilities. The lack of access to public toilets can have significant social and medical implications for these groups.

Hong Kong is a bustling city with excellent infrastructure, making it a popular tourist destination that significantly contributes to the local economy. Therefore, well-maintained public toilets can bring substantial economic benefits to the government and improve Hong Kong's global reputation. These guidelines provide an overview of how to develop and maintain the quality of the city's public toilets, ensuring public health, hygiene, and safety for the community, as well as meeting the needs of the many tourists and visitors.

The public toilets in Hong Kong are generally categorized as follows

- 1.1 Toilets built and managed by the government are located in parks, tourist spots, playgrounds, musical halls, public transportation terminals, and markets.
- 1.2 Experience clean and well-maintained communal toilets in shopping centers, expertly managed by private entities.
- 1.3 Toilets are conveniently located at food establishments, such as restaurants, bars, and fast food chains, ensuring a comfortable and hygienic experience for customers.
- 1.4 Toilets provided for ad-hoc activities, such as at public events and markets, and are available on a temporary basis.

The government-provided public toilets are mostly open 24 hours a day, except for those located in markets, government premises, and at events organized by the recreational and cultural services department. The communal toilets in shopping malls typically close before midnight. It's important for some users, like public transport operators (taxi and truck drivers) and medical care providers (nurses), who have different shift patterns, to have access to clean public toilets at all hours. Clean and hygienic public toilets are crucial to provide convenience to all 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 founding members of the Hong Kong Toilet Association (Professor Kin Wai Michael Siu, Poly-University, 2006²). In addition, Dr Henry Hung, past President and founding member of the Hong Kong Toilet Association emphasizes 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 recommendations below have been modified to include the CASH+ME initiative from a design perspective. These proposals are a combination of ideas from the public, service providers, and professional advisers. They focus on creating economically affordable, durable, and practical design solutions for the community to protect both people's well-being and public health. Currently, public toilets are often perceived as dirty and unpleasant places, making users unwilling to stay long in them. However, by implementing better design and ensuring accessibility, safety, and hygiene, the following design criteria should be considered for creating high-quality public toilets that align with 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 odors in public restrooms can be uncomfortable. The key to improving air quality in public restrooms is an effective ventilation system. For toilets without natural ventilation, a mechanical ventilation system should be installed to provide adequate ventilation, with a minimum of ten air changes per hour. Additional exhaust ducts should be connected at the back of the toilet stalls, positioned 100 mm higher than the top of the toilet bowl, and a fresh air inlet should be installed at a height of approximately 1800mm above the toilet bowl.

2.1.2 Urinals can produce unpleasant odors when urine is not disposed of immediately. It is recommended to use automatic motion sensor flushing devices to dispose of urine when the user leaves the urinal. Auto-flushing cisterns are not recommended because the urine remains in the urinal



until the cistern is fully replenished after the previous

flush, which may take 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 It is recommended to have a sound system with a moderate sound level (not exceeding 55 dBA) playing light music, such as flowing water background music. The sound system can be activated by a sensor device, and it is intended to help users feel more comfortable and relaxed when using the public toilet.

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

2.1.5 The current perception of public toilets is that they are dirty and unpleasant, leading users to leave quickly without flushing or washing their hands. To address this issue, several design recommendations have been proposed to create a more comfortable environment. These include installing an efficient ventilation system to improve air quality, using automatic motion sensor flushing devices for urinals, incorporating a sound system with light music, implementing an audio system to remind users to flush the toilet, and adding plants to enhance the overall environment.



2.1.6 A litter bin with a foot pedal or electronic sensor operated cover should be placed in each female toilet cubicle 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 eye level.



2.1.8 Baby feeding rooms should be provided for both breast and bottle feeding. The room should be located in an enclosed area near the restroom, but it's better to have a separate room with a chair and table. The room should also be well-ventilated.



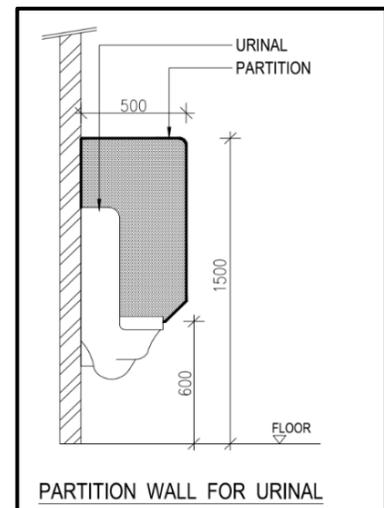
2.1.9 Clear signage should be displayed on the door of the cubicles to indicate if the toilets are seated or squatting.



2.1.10 Where possible, waiting areas with benches 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 Paruresis, also known as shy bladder syndrome, is a form of social anxiety where a person feels uncomfortable urinating in the presence of others, particularly in public toilets.⁴ To address this issue, when designing urinals, it is important to allow sufficient space on both sides and behind them. It is recommended that the dividing board should be fixed at a height of 1500mm above the floor and a width of 450mm. Whenever possible, urinals should be located in isolated areas with less foot traffic.



2.1.12 Parcopresis, also known as shy bowel syndrome⁵, is a condition where a person feels uncomfortable defecating in the presence of others. To accommodate individuals with this condition, it is recommended to have partition walls between cubicles that are at least 2.5 meters high, reaching the ceiling. Additionally, there should be no gap between the side partitions of the cubicles. For safety reasons, it is suggested to have the entrant door with a gap of no more than 100 mm from the floor level.



2.1.13 Public toilets should be painted in bright colors to create a comfortable environment. The wall, floor tiles, and lighting should harmonize with the surrounding area.



2.1.14 Toilet paper should be provided in all restroom stalls. It would be beneficial to install



alternative materials like newspapers, which can lead to clogged toilets and hygiene issues, especially during peak usage times.

toilet paper dispensers with sensors that can alert the attendant when the paper is running low. Another option is to use double-rolled toilet paper dispensers, where the second roll is available once the first one is used up. This would help prevent people from using



2.1.15 In order to provide convenience and comfort for users, it is recommended to install a shelf of appropriate height and size for personal belongings in both male and female cubicles, as well as near urinals in male restrooms. The shelf should be securely fixed within sight to prevent theft.



2.1.16 A baby diaper changing table is a necessity in both male and female restrooms to ensure equal access and convenience for all parents.



2.1.17 Toilets are not only for personal needs but also for other purposes. For example, ladies may also use the restroom to touch up their makeup if a mini-powder room is available.



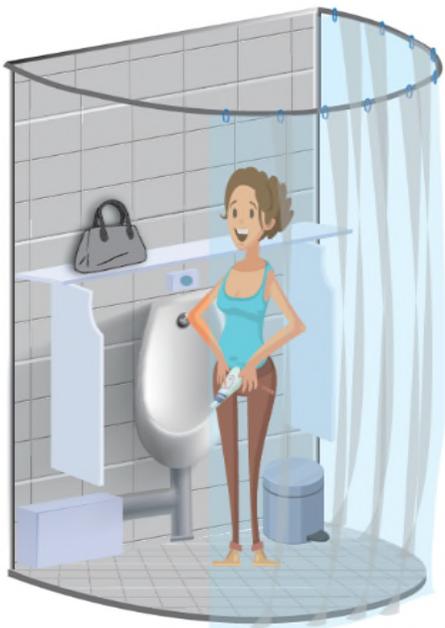
2.1.18 At present, mobile phones are used almost everywhere, and providing USB charging and wifi facilities in public toilets would offer extra convenience.

2.2 Accessibility

Access to a clean and hygienic public toilet can be a growing concern, particularly for disabled and elderly individuals, families with young children, or pregnant women. This group of people may feel isolated and reluctant to leave their homes due to the lack of access to a clean public toilet with the necessary facilities. Therefore, the following recommendations are suggested to enhance accessibility to high-quality public toilets.

2.2.1 Women often experience long wait times to use public toilets, especially during special events and large conferences. Current regulations state that there should

be 2.5 times more female toilets than male ones.⁵ However, this ratio does not consider the presence of urinals in male toilets⁶.



Studies have found that women take about twice as long as men in the toilet. Therefore, the current ratio of 1:2.5 should account for the urinals in male toilets. For example, if a male toilet has three water closets and three urinals, then the female toilet should have 12 water closets. Adding more toilet cubicles to existing female toilets can be

challenging, so another solution could be to introduce female urinals. By using specially designed funnels called "Stand and pee", women can now stand and urinate, similar to men. This can improve toilet accessibility and reduce waiting times during peak



periods. However, a curtain (like a shower curtain) is suggested to be provided for privacy reasons (as demonstration).

2.2.2 The government is encouraging people to use public transportation as much as possible. However, the lack of public toilet facilities in public transport stations is a serious concern for most people. Therefore, public toilets should be provided at public transport stations such as those of the MTR, as well as at major bus terminals and ferry terminals to different islands.



2.2.3 In both male and female restrooms, at least one baby seat with a safety belt should be installed in the cubicles. This will allow adults to look after infants and small children while using the restroom. The cubicles with this feature should



be slightly enlarged and have signage displayed on the doors.



2.2.4 Family restrooms with sanitary facilities for adults and children, including a diaper changing table, provide convenience for families with young children.



2.2.5 Boys who are under 5 years old or less than 1 meter tall often require assistance in the toilet and may need to use a urinal for children, which should be provided in the male and female toilet with a partition panel.



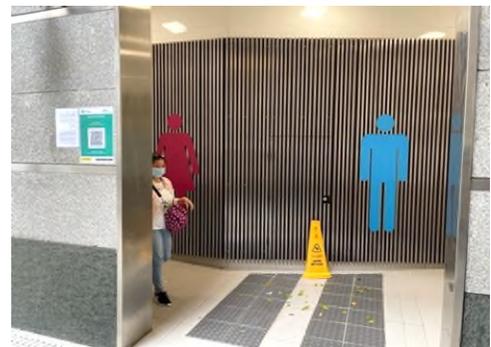
2.2.6 The signs indicating sitting or squatting toilets should be displayed on the doors of the cubicles so that users can choose their preference without having to open the doors, saving time especially during busy hours.



2.2.7 The locations of public toilets are clearly marked with visible signs for easy access. Direction signs should be posted on the streets within a one-mile radius of the designated toilet. Information regarding the exact locations of public toilets, their opening hours, and the availability of facilities for those with special needs should be easily accessible on the internet and websites. This information should also be promoted in travel leaflets.



2.2.8 Easily identifiable 'Male' and 'Female' signs are prominently displayed at public toilet entrances for your convenience.



2.2.9 Providing baby diaper changing facilities in both female and male restrooms is essential for promoting gender equality and ensuring that all parents have access to the necessary amenities when caring for their children.



2.2.10 In order to ensure inclusivity and convenience, it is essential to provide at least one urinal for children in every public toilet.



2.2.11 Individuals with disabilities should have access to all public toilets with step-free access from street level. "Disabled" refers not only to the elderly and individuals with walking difficulties, but also to those with visual or hearing impairments. Guiding paths with handrails and Braille instructions should be provided for visually impaired individuals. Mixed-gender public toilets should be available for those who need them, especially for disabled elderly people.



2.3 Safety

Safety considerations are crucial for public toilets because they are environments where there is a high risk of transmitting viruses and potential accidents to users, 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. Sharp angles or edges should be avoided, and openings on pipelines and access panels should be provided for maintenance purposes.

2.3.2 For safety and privacy, mirrors should not be installed in a position where they would reflect the users in the toilet. In individual toilet cubicles, it is recommended to have lights that indicate occupancy. When the cubicle is in use, a red light should be ON to show that the cubicle is occupied. Likewise, a green light should be turned ON to show that the cubicle is vacant.

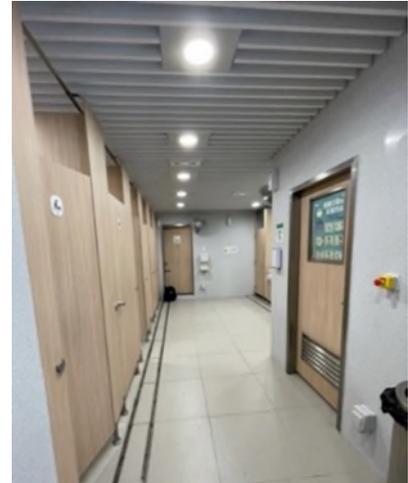


2.3.3 When installing a squatting toilet pan, handrails must be provided. Additionally, at least one urinal should be equipped with a grab bar for elderly or disabled users.



2.3.4 Insufficient lighting leads to a lack of security for users.

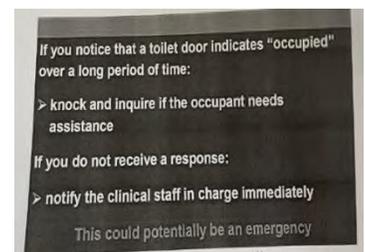
It's crucial to ensure that ambient lighting is maintained at a minimum of 300 lux to guarantee a safe and comfortable environment.



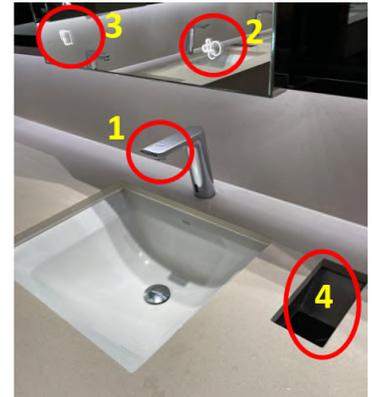
2.3.5 To ensure a safe environment, it is essential to store cleaning equipment such as brooms, buckets, and cleaning agents in the custodian's room. This practice helps prevent accidents and promotes a hazard-free workplace.



2.3.6 'Safety check' procedures should be implemented at least hourly in public toilets to monitor the well-being of individuals who may be unwell or in need of clinical assistance.⁷



2.3.7 A design concept for 4-in-1 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 one area. The hand dryer will blow water from the hands directly into the basin. This design has several advantages. It minimizes the chances of wet hands causing slippery floors, which is unsafe, and it also minimizes traffic within the toilet area.



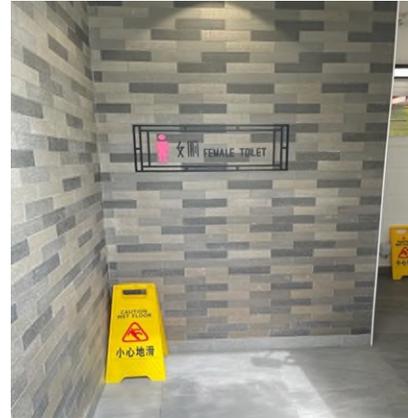
2.3.8 Let's ensure the safety of disabled individuals by installing emergency call buttons in their restrooms and linking them to the healthcare system after office hours.



2.4 Hygiene

When designing and constructing high-quality public toilets, prioritizing hygiene is essential. The following guidelines offer a framework for safeguarding the public and addressing hygiene issues that may arise in public restrooms, particularly with regard to the transmission of viruses.

2.4.1 Germs may be present on surfaces such as walls, door handles, and knobs. When people touch these areas, they can transfer viruses to the next person. Therefore, it is advisable to implement a touchless concept starting from the entrance to the toilet. Ideally, the main entrance of a toilet should not have a door and should have an off-set entrance design.



2.4.2 All drainage and water supply pipes connecting to the sanitary appliances should be securely fixed and hidden in walls or floors to prevent dirt from getting trapped between the walls and the pipes. This can



make cleaning difficult and create a breeding ground for germs. Where the pipes change direction, it's important to install rodding eyes to allow for easy cleaning and maintenance in case of blockages.



2.4.3 Sufficient ventilation reduces the likelihood of foul air and viruses in a room; therefore, the mechanical ventilation system in public toilets should achieve a minimum of ten air changes per hour.



2.4.4 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.



2.4.5 Research has shown that flushing a toilet can release aerosol particles containing viruses from the toilet bowl, potentially exposing users to the viruses (Li et al., 2020).⁸ It is strongly recommended to have signs advising users to lower the toilet seat cover before flushing, and the same applies to squatting toilet pans⁹. These signs should be prominently displayed.



2.4.6 The floors and walls of public toilets should be fully tiled with water-repellent materials and non-slip surfaces. Using larger tiles and colorful ceramic or glazed wall tiles is recommended to create a shiny and bright environment. This helps to prevent germs from accumulating between the joints of the floors and walls.

2.4.7 The use of U-shaped toilet seats¹⁰ is recommended for hygienic purposes. They provide a space that helps avoid contact with the seat, particularly for women, allowing them to wipe the perineal area after urinating. This requirement was included in the American Standard National Plumbing Code in 1955 and the Uniform Plumbing Code in 1973.



2.4.8 In some tourist areas, people from different parts of the world, with different religions, use public toilets and may not use paper towels to clean themselves. Therefore, it is recommended to have at least one water tap with a shower jet inside the cubicles of both male and female toilets.



2.4.9 Users often hesitate to sit on public toilet seats and may instead squat on the toilet bowl. This practice is very dangerous and has resulted in injuries. To address this issue and promote hygiene, it is important to provide liquid toilet seat sanitizers with a refillable bottle in toilet cubicles. This will not only improve hygiene but also prevent users from resorting to using excessive amounts 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 established for the overall management of the toilet facilities. Substantial resources are required to maintain the facilities in good working condition. The scope of the work is outlined as follows:

3.1 Cleaning toilet facilities

- 3.1.1 A cleaning schedule should be established based on the frequency of toilet usage, with options for daily, weekly, or monthly cleaning. The schedule should also account for times that will not cause inconvenience to the public. Toilets in high-traffic areas like tourist spots or shopping malls should be cleaned more frequently compared to those in office or school settings.
- 3.1.2 Professional-approved cleaning agents should be used for different facilities to prevent damage to sanitary wares, 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 mechanical ventilation systems, it is essential to engage professional engineers and technicians for routine checks and cleaning of moving parts, especially the filtration systems, to maintain air quality standards.
- 3.1.4 To ensure the safety of all individuals, it is crucial to adhere to safety measures when cleaning public toilets. The following steps should be strictly followed:
 - 3.1.4.1 Displaying the safety cleaning signage before starting any cleaning work is crucial for everyone's safety.

- 3.1.4.2 Ensure a thorough cleaning of all sanitary fixtures, including the inside and outside of the toilet bowl, basin, taps, and countertop areas.
 - 3.1.4.3 Ensure a thorough cleaning of the walls and floors of the toilet cubicles for a pristine and hygienic environment.
 - 3.1.4.4 Ensure the urinal bowls or urinal trough are thoroughly cleaned.
 - 3.1.4.5 After thoroughly drying the entire toilet area floor with a mop, it's crucial to use a portable high-speed fan to effectively prevent slipperiness.
 - 3.1.4.6 Prioritize cleanliness by removing the grating cover near the urinal (if installed) and conducting a thorough cleaning of both the cover and the channel.
- 3.1.5 Ensure all handwashing liquid dispensers are regularly checked and refilled as necessary. Additionally, promptly replace any empty or insufficient toilet paper rolls and paper towels.
- 3.1.6 Ensure all consumables are accurately recorded on the record sheet and promptly report any defects or shortages to the engineering department. This is crucial for maintaining a safe and efficient work environment.

3.2 Maintenance of toilet facilities (repair and replacement)

3.2.1 Defective facilities must be labeled and covered with protective materials for safety. Any issues should be recorded and reported to management immediately. Regular inspections of toilet facilities, including water cisterns, sensor flushing valves, wash-hand basins, and urinals, should be conducted weekly or monthly, depending on the nature of the facilities and the operating sequence of the system.



3.2.2 All cleaning agents must be eco-friendly and approved by management, properly labeled, and stored according to manufacturers' instructions.

3.3 Training

3.3.1 It is important to provide training for toilet attendants and supervisors in order to uphold the cleanliness and safety standards of public restrooms. Therefore, it is essential to hire qualified supervisors and attendants, and this requirement should be included in the terms and conditions for cleaning contractors. The contracting company should be certified and compliant with the International Organization for Standardization (ISO) standards.

3.4 Contract review

3.4.1 Outsourcing the cleaning work is an alternative way to manage public toilets. In such cases, the contract terms should be regularly reviewed to ensure full implementation and compliance with the terms and conditions. Regularly scheduled or ad-hoc inspections will help maintain the effectiveness of the contractual work and alert the contractor to sustain the quality of their service.

3.4.2 A well-designed logbook should be securely kept in the public toilet so that the inspector can check the facility at any time. To ensure that the contracting company is meeting the toilet cleaning requirements, a key performance index system should be implemented to monitor their performance. This system can also be used to monitor the performance of individuals responsible for maintaining the public toilet.

3.5 Well-being of the toilet attendant

3.5.1 Public toilets should be well-maintained and supervised. Toilet attendants play a crucial role in ensuring the cleanliness and hygiene of the facilities. Adequate space should be provided for the attendants, with a suggested area of at least six square meters for both male and female attendants. If more attendants are required, the space should be expanded accordingly. The room should be well-ventilated with proper lighting and a spacious storage area for supplies such as toilet tissues, sanitizers, and liquid soap for the dispenser. Additionally, a slop sink should be provided for washing mops and cleaning clothes.

3.5.2 All toilet attendants are required to wear clean uniforms for easy identification, and it is essential that they receive certified training from a professional body.

3.6 Check list and record

3.6.1 The toilet attendant must keep a detailed record. The toilet supervisor will inspect the toilet at specific times and sign the record book. Ad-hoc inspections will also be conducted to ensure that the cleaning work is done as specified at any time. The record sheets or books must be kept under lock and key. The content of the record 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 well-built toilet can become unsanitary if the infrastructure is not properly maintained and used by the public. Therefore, it is crucial to educate users on the proper use of toilet facilities. From the designer's perspective, the use of user-friendly and durable materials can have a long-term impact on user behavior. For instance, a clean and user-friendly toilet is always preferable to one that lacks proper hygiene and safety measures.

To promote proper use of toilet facilities, it is recommended to have educational materials in both Chinese and English, using simple and clear language. Colorful and eye-catching posters should be placed in display boxes or frames to prevent graffiti. Additionally, audio educational messages accompanied by light music can be broadcasted in the restroom. Motion sensors may also be installed to activate the system upon entering the toilet, reminding users to use the facilities appropriately, such as by maintaining cleanliness and hygiene, disposing of waste in the bins, keeping the floor dry, flushing the toilet after use, and lowering the toilet seat and cover before flushing. Adhesive stickers can be used in male urinals to remind users to aim properly and avoid spills. During the pandemic, additional signage should be added to remind users of special precautions such as social distancing and wearing masks, even in the toilet. A 'No Smoking' sign should also be displayed, and users should be encouraged to clean the toilet after use for the next user. Clean Toilet Campaign.

The government, along with voluntary organizations, should raise awareness about the importance of clean and hygienic public toilets for public health and for upholding a positive image of a metropolitan city like Hong Kong. Education on this topic should start at the preschool level and continue through higher education, with an annual "Clean Hong Kong Toilet Campaign." Private sectors, such as shopping malls, are encouraged to take

part in the campaign. A team of cleaners recruited from schools or voluntary organizations should be deployed annually to inspect public toilets and educate the public about the proper use of these facilities. It should be emphasized that maintaining clean public toilets not only enhances Hong Kong's image but also contributes to public health.

I. Appendix

A. Installation of Facilities in Public Toilets

- Water-saving devices should be installed in all public restrooms to conserve water and protect the environment. The materials used should be durable, easy to maintain, and resistant to vandalism.¹²
- Due to environmental concerns, it is advisable to use low-capacity flushing cisterns for toilet flushing. Waterless urinals are also recommended to conserve water. Furthermore, all water taps should have low flow in compliance with the Water Supply Department (WSD) water saving scheme.
- The name of the cleaning attendant, along with the cleaning company/agency, should be clearly displayed.
- A designated room with proper ventilation (fan or air conditioning) should be provided for the attendant to rest and have their meals. A slop sink should be installed for the attendant to wash cleaning utensils.

All plumbing work must be completed by licensed plumbers, and drainage work should be carried out by building contractors registered with the building department.

- Plumbing works must adhere to building regulations, including sanitary fitments, plumbing, drainage, and latrines standards as well as WSD regulations¹⁴.

B. Pros and cons of toilet facilities

No.	Description	Pros	Cons
1	Automatic flushing system for urinal	<ol style="list-style-type: none"> 1. Consistently flush the urinal. 2. Reduced investment costs. 3. Simple to fix if any issues arise. 	The flushing system will activate when the water level reaches a certain point, and a syphon will release the water on a preset cycle determined by the management. The system will operate continuously, regardless of user activity.
2	Auto-sensor type water tap	Opting for touchless operation minimizes the risk of virus transmission, promoting a hygienic environment.	<ol style="list-style-type: none"> 1. Higher material costs include the cost of electronic devices and wiring. 2. Increased maintenance expenses.
3	Squatting toilet	<ol style="list-style-type: none"> 1. Minimized risk of coming into contact with the toilet bowl. 2. Cleaning is a breeze compared to a traditional pedestal toilet bowl. 3. Squatting while using the toilet fulfills a cultural need for most Asian people. 	<ol style="list-style-type: none"> 1. Challenging for seniors to rise after use, especially for the elderly. 2. Most squat toilets come without a cover, which can lead to the transmission of viruses when the toilet is flushed.
4	Scupper channel with drain and grating	Collect water from the floor surface and direct it to the drainage channel to prevent the floor from getting wet and slippery.	The virus will remain in the scupper channel and grating unless it is thoroughly washed and cleaned at least every hour. If traffic is high, the cleaning frequency should be increased.
5	Air refreshener	To eliminate the unpleasant odor in the toilet area.	The spray may contain volatile organic compounds (VOCs) which can impact air quality, health, and the ozone layer from an environmental perspective.

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Ms Yung Lai Chun, Jenny (Vice Secretary)

Ms Kung Sui King, Dorothy (Treasurer & Technical Chairlady)

Contacts

Hong Kong Toilet Association

Address : Suite 9, 29/F, Cable TV Tower, 9 Hoi Shing Road, Tsuen Wan, NT. Hong Kong

Telephone : 852 3420 0285

Email Address : info@hktoilet.com

Website : www.hktoilet.com

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