THE HONG KONG INSTITUTION OF ENGINEERS 香港工程師學會

Building Services Division 屋宇裝備分部

Joint Taskforce (JTF) Working Group - HKIE-BSD, CIBSE-HKR, CIPHE-HKB, BSOMES
Press Conference on 29 Dec 2020 (Leaky Drain Busters)

General Comments on the Design, Installation, Operation and Maintenance of Drainage System and Ventilation Effectiveness of Toilets in Residential Buildings in Hong Kong

The Joint Taskforce (JTF) named "Leaky Drain Busters" convened a Press Conference on 29 Dec 2020 at Zero Carbon Park (ZCP) with many local Press Media participated. Following the presentation given by the Convenor Ir Prof. P L Yuen (HKIE President), Adviser Ir Victor Cheung (HKIE Past President) and a team of Joint Taskforce Working Group Members. The JTF is of the opinion that several possible root causes of problems leading to the outbreak of COVID-19 pandemic in the residential flats have been identified with suggested solutions.

JTF's findings suggested that the building drainage system was a possible transmission path of the virus due to lack of proper maintenance and improper modification to the drainage pipes inside the flats after renovation/ alteration works, and the JTF also provided various proposed tackling measures. All presented views in gist are shown as follows.

Reducing COVID-19 Contamination Risks by Improving Drainage System

Views on certain aspects of the building drainage system would need to be improved to account for the misuse and ongoing maintenance of good hygiene standard of residents' living conditions with brief summary per below:

1. Foul smell from soil drainage pipe due to water seal loss of floor drain leading to possible contaminant source transmitted from floor drain. JTF recommended to pour about half a litre of water into each floor drain every week so as to maintain sufficient level of water seal as well as install movable floor drain cover for preventing smell spillage;
2. Without proper connection to vent pipe with soil fitments and water seal loss of floor drain have transmitted contaminant source from soil fitments. Also leakage or crack of drainage pipe caused contaminant source entering into the residents' flats. JTF recommended that a competent person should be appointed for inspection if foul smell or cracks from drainage pipes are found; and
3. Contaminant source entering into the residents' flats through vent pipe outlet at roof. JTF showed the simulated vent pipe at 2.5m height and / or re-located to the centre of building of a recent concerned building would be able to mitigate the air turbulence effect leading to possible contaminant source from entering into the residents' flats.

Recommendation on Mitigating Virus Dispersion Risks by Property Management Sector

1. Carry out routine pipework inspection and cleaning to prevent from blockage of pipework;
2. Arrange competent person to conduct periodic inspection and subsequent rectification work;
3. Conduct routine high pressure jet and cleaning to pipework;
4. Replace aging pipework and fittings; and
5. Suggest additional visual inspection to each patrol point of inspection checklist.

Reducing COVID-19 Contamination Risks by Improving Indoor Ventilation Effectiveness

Ventilation plays a key role in the transmission of the COVID-19 pandemic in residential flats via possible airborne route. The contaminated air could enter the flats from the floor drains without water seal, damaged drainage pipes / fitment and windows in case the airflow not being well controlled. Some suggestions on improving ventilation in residential flats to reduce the possible risk of COVID-19 transmission are outlined as follows:

1. Open windows and doors that facing cleaner spaces or outdoors when using ventilation fans in toilets and kitchens. When the fans are operating, it causes negative pressure in the toilets and kitchens. As a result, the contaminated air in the drainage pipes can easily enter the flat from the floor drains and damaged drainage pipes / fitments. By opening the windows and doors slightly, the clean air will make up the air exhausted by the fans, which reduces the risk of COVID-19 transmission from the alleged building drainage system;
2. Create good cross ventilation by using effective ventilation fans and opening windows and doors so as to induce the airflow from cleaner spaces (e.g. living rooms and bedrooms) to less clean spaces (e.g., kitchens and toilets);
3. Open the fresh air inlets of the air conditioners where appropriate. If the air conditioners do not have fresh air inlets, open doors and windows slightly so as to increate air changes via creation of good cross ventilation. In case it is not possible to open windows and doors, use high-efficiency air cleaners as alternative in enclosed spaces to improve indoor air quality; and
4. Residents should not open the windows facing less well ventilated light wells, as air contaminants infiltration risk is relatively higher.

Long Term Improvement Plan

JTF has reviewed all relevant aspects of the existing building drainage design, installation, operation and maintenance so as to come up with the following recommendations:

1. Recommend to establish a Building Drainage Worker Registration Scheme so as to enhance skills set of the building drainage practitioners and ensure drainage pipe installation during renovation or alteration works are in good working manner and met statutory regulations;
2. Recommend Registered Professional Engineer (RPE) in relevant disciplines be employed to inspect, supervise and certify the drainage installation work and submit the Testing and Commissioning Report to the relevant Government Authorities.
3. Establish subsidy in the form of Eco Building Fund to support those necessary residents to conduct enhancement work of building drainage pipe installation;
4. Separate One-pipe System vs Two-pipe System for providing further enhancement to eliminate occurrence of possible risks of cross contamination; and
5. Locating vent pipe at 2.5m height as well as moved to location away from openable windows.

In summary, the JTF is of the view that the existing design of the building drainage system has met the relevant statutory regulations. However, subsequent improvement on design, installation, operation and maintenance of building drainage system could be made so as to enhance users' attentions and alertness especially toward the need for periodic inspection and maintenance of the building drainage system, and on such works to be supervised and certified by Registered Professional Engineer (RPE) in relevant discipline. On site works execution where in order to have consistent quality control delivered site works, it is required to secure practitioners with proper trained skills set to carry out renovation / alteration works, and the establishment of Building Drainage Worker Registration Scheme is highly recommended.

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附上發佈會內容 PDF 檔案以供參閱 有關傳媒報告超連結

RTHK - Facebook
https://www.facebook.com/RTHKVNEWS/videos/3467598956684341/

HK Net - 4 個工程學會組成聯合渠務小組　倡政府加強規管樓宇渠管改裝
https://topick.hket.com/article/2839934?r=cpstni

On.CC - 住宅喉管破損易播毒　工程師學會籲定期檢查及注水U型隔氣
https://hk.on.cc/hk/bkn/cnt/news/20201229/bkn-20201229161915394-1229_00822_001.html

Sing Tao - 工程學會倡 U 型渠倒水 加長天台排氣喉至屋頂 2.5 米避「擾流效應」
https://std.stheadline.com/realtime/article/1462732

am730 - 專家：喉管老化增傳播風險 籲曾改裝廁所或大樓齡戶檢查
https://www.am730.com.hk/news/share/249552

Ta Kung Pao - 專家揭大廈隱患, 渠管播毒 五招自救
http://paper.takungpao.com/resfile/PDF/20201230/PDF/a1_screen.pdf

Convenor, Adviser and all Joint Taskforce Members

Leaky Drain Busters

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源柏樑教授工程師 Ir Prof. PL Yuen (HKIE President)	張志剛工程師 Ir Victor Cheung (HKIE Past President)

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外防滲透
抗疫同行

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譚兆麟 工程師
余偉沛 工程師
李文光 工程師
李琨 工程師
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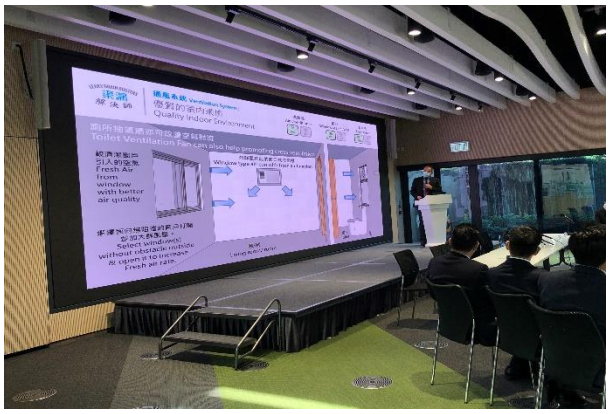
Photos Sharing



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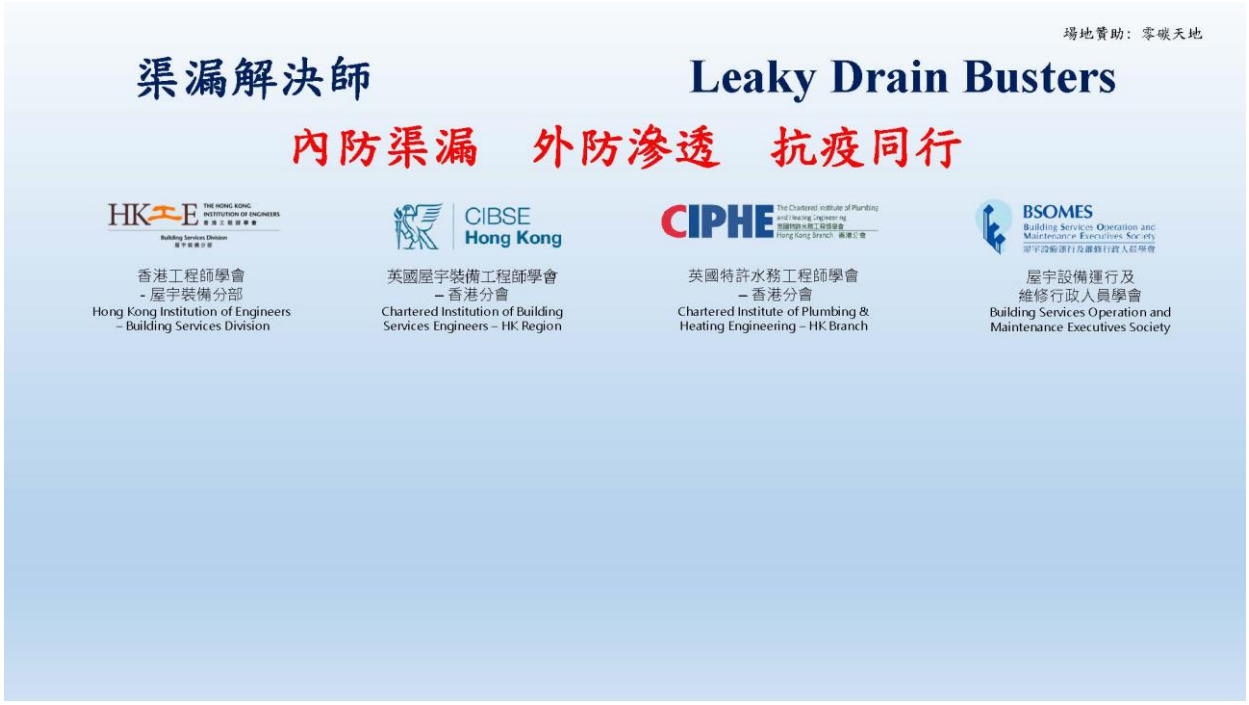
Press Conference – PowerPoint



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LEAKY DRAIN BUSTERS
渠漏
解決師

29 December 2020
新聞記者會

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CIBSE Hong Kong

CIPHE The Chartered Institute of Plumbing and Heating Engineering
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BSOMES
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主旨

- 鑑於COVID-19 ，從工程專業角度分析不同渠管問題在社區傳播，研究重點放在大多數市民居住的住宅建築物
- 透過工程和科學考量相關排水和廁所通風風險等方面問題，並提出改善措施，減低病毒散播
- 考慮公眾急需的短期措施為要務，更提倡中長期應對渠漏方案

LEAKY DRAIN BUSTERS 渠漏解決師

聯合工作委員會 "渠漏解決師" 簡介 Leaky Drain Busters

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外防滲透
抗疫同行

LEAKY DRAIN BUSTERS 渠漏解決師

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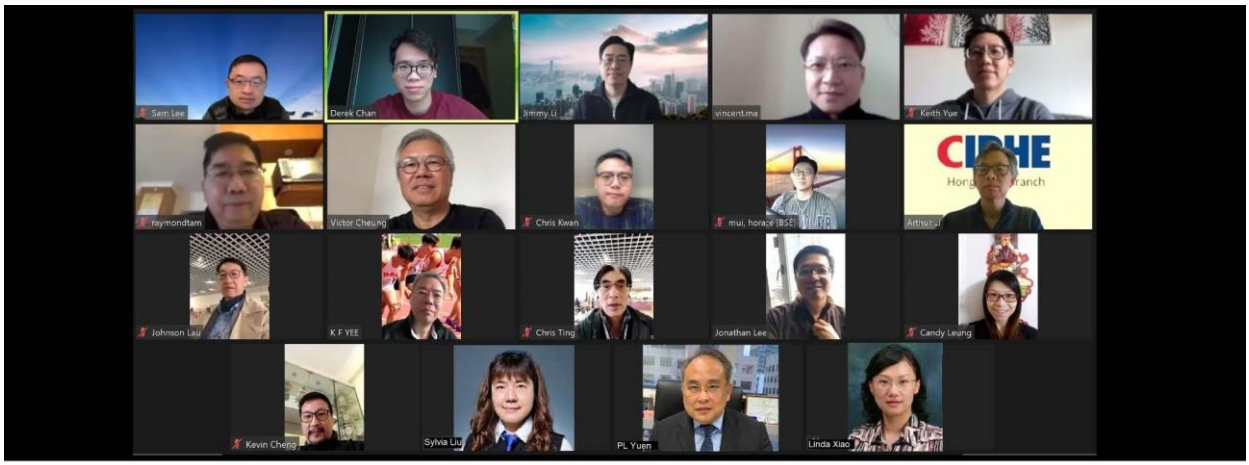

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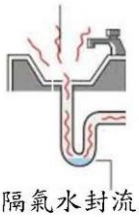
渠管失修

臭氣及
病菌

臭氣及病菌散播
污染室內空氣



隔氣水封流失

LEAKY DRAIN BUSTERS
渠漏
解決師

渠務系統
通風系統
相關問題

廁所通風有機
會幫助擴散

圖片來源：Google資訊

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問題（渠務系統 A）

解決方案

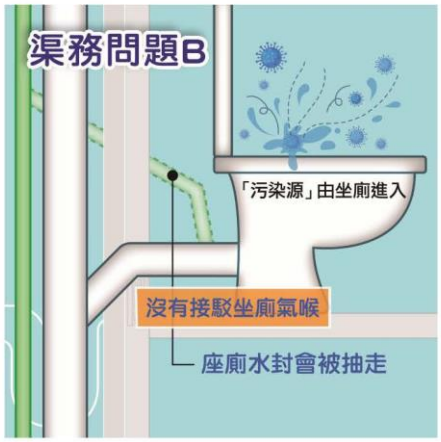
每周用至少0.5L的水沖洗排水點，使水封存水，堵塞細菌及異味

安裝活動式地渠蓋片

LEAKY DRAIN BUSTERS 渠漏解決師

部份圖片來源: PLOS ONE Journal/ Google website

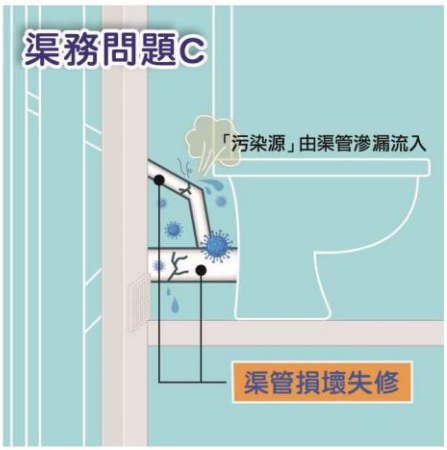
問題（渠務系統 B）



解決方案

LEAKY DRAIN BUSTERS 渠漏解決師

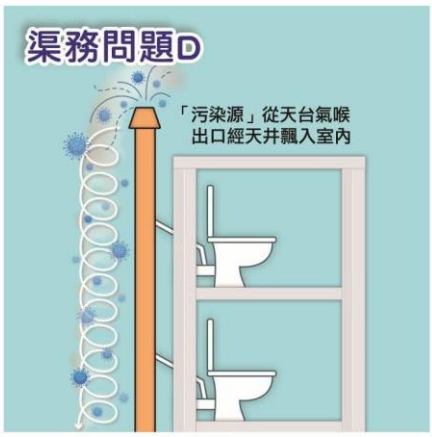
問題（渠務系統 C）



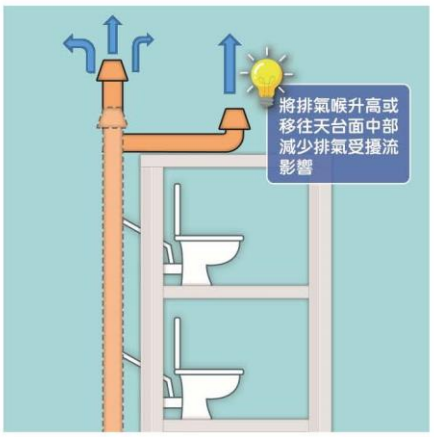
解決方案

LEAKY DRAIN BUSTERS 渠漏解決師

問題（渠務系統 D）



解決方案



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LEAKY DRAIN BUSTERS 渠漏解決師

通風系統 Ventilation System :
換氣扇及污染
Ventilation Fan and Contamination

換氣扇 Ventilation Fan	天井窗 Window at Light Well	廁所門 Toilet Door
開 ON / 關 OFF	開 OPEN / 關 CLOSE	開 OPEN / 關 CLOSE

LEAKY DRAIN BUSTERS 渠漏解決師

通風系統 Ventilation System :
換氣扇及污染
Ventilation Fan and Contamination

換氣扇 Ventilation Fan	天井窗 Window at Light Well	廁所門 Toilet Door
開 ON / 關 OFF	開 OPEN / 關 CLOSE	開 OPEN / 關 CLOSE

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通風系統 Ventilation System :
換氣扇及污染
Ventilation Fan and Contamination

換氣扇 Ventilation Fan	天井窗 Window at Light Well	廁所門 Toilet Door
開 ON / 關 OFF	開 OPEN / 關 CLOSE	開 OPEN / 關 CLOSE

LEAKY DRAIN BUSTERS 渠漏解決師

通風系統 Ventilation System :
換氣扇及污染
Ventilation Fan and Contamination

換氣扇 Ventilation Fan	天井窗 Window at Light Well	廚房門 Kitchen Door
開 ON / 關 OFF	開 OPEN / 關 CLOSE	開 OPEN / 關 CLOSE

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通風系統 Ventilation System :
換氣扇及污染
Ventilation Fan and Contamination

換氣扇 Ventilation Fan	天井窗 Window at Light Well	廚房門 Kitchen Door
開 ON / 關 OFF	開 OPEN / 關 CLOSE	開 OPEN / 關 CLOSE

LEAKY DRAIN BUSTERS 渠漏解決師

通風系統 Ventilation System :
換氣扇及污染
Ventilation Fan and Contamination

換氣扇 Ventilation Fan	天井窗 Window at Light Well	廚房門 Kitchen Door
開 ON / 關 OFF	開 OPEN / 關 CLOSE	開 OPEN / 關 CLOSE

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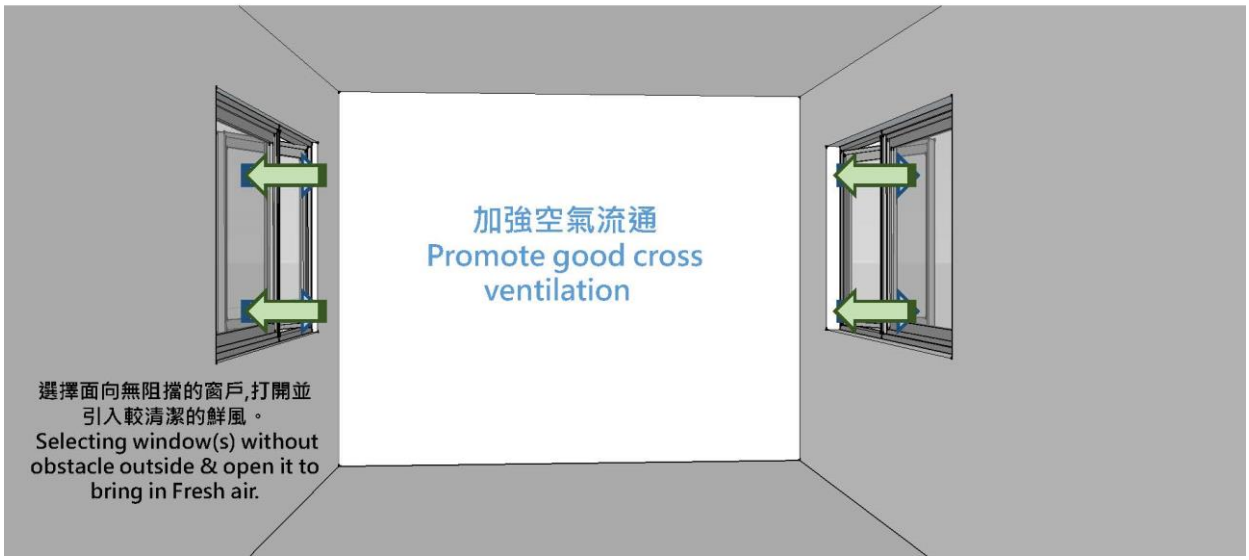
通風系統 Ventilation System :
優質的室內環境
Quality Indoor Environment

窗戶
Window at Light Well
開 OPEN | 關 CLOSE



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通風系統 Ventilation System :
優質的室內環境
Quality Indoor Environment

換氣扇 Ventilation Fan	天井窗 Window at Light Well	窗戶(較清潔空氣) Window (Clean Source)	廁所門 Toilet Door
開 ON / 關 OFF	開 OPEN / 關 CLOSE	開 OPEN / 關 CLOSE	開 OPEN / 關 CLOSE

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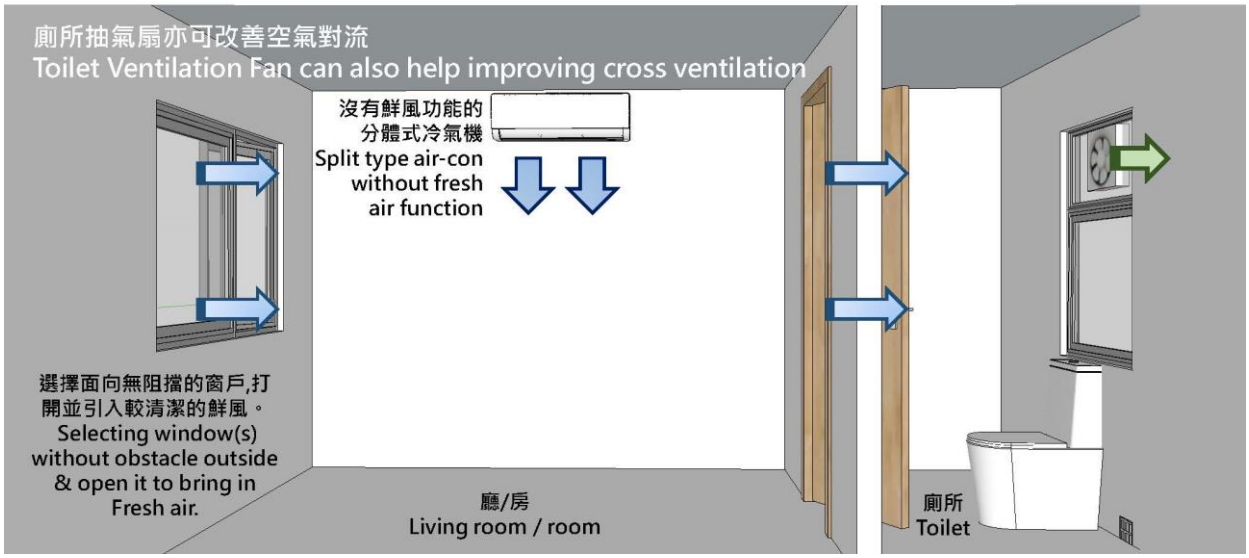
LEAKY DRAIN BUSTERS 渠漏解決師

通風系統 Ventilation System :
優質的室內環境
Quality Indoor Environment

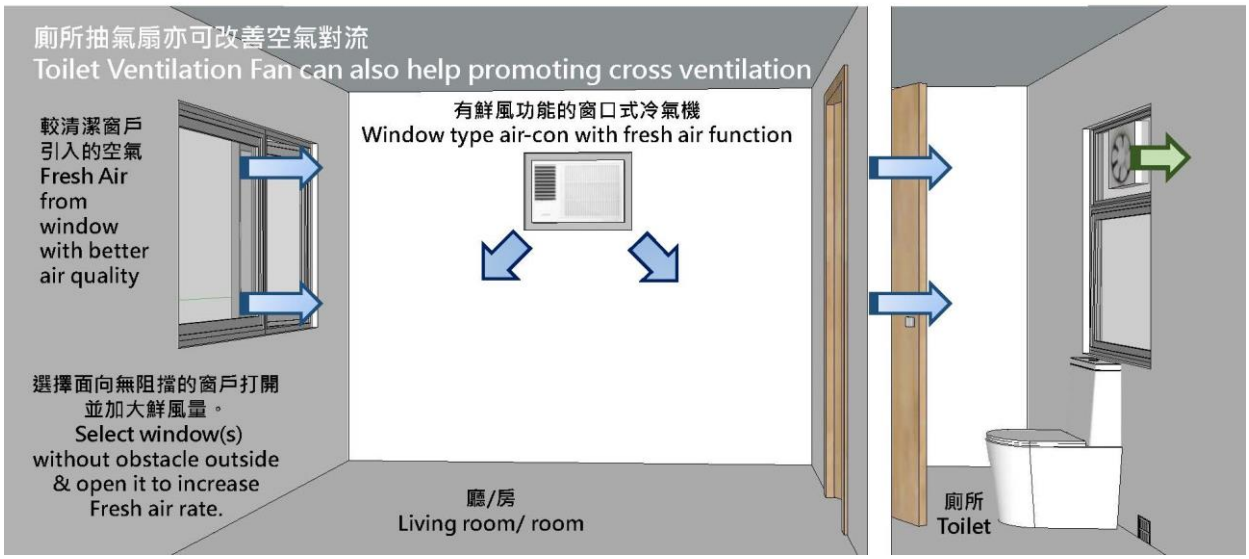
換氣扇 Air-Conditioner: 開 ON / 關 OFF
窗戶 Window at Light Well: 開 ON / 關 OFF
廁所門 Toilet Door: 開 OPEN / 關 CLOSE



LEAKY DRAIN BUSTERS 渠漏解決師

通風系統 Ventilation System :
優質的室內環境
Quality Indoor Environment

換氣扇 Air-Conditioner: 開 ON / 關 OFF
窗戶 Window at Light Well: 開 ON / 關 OFF
廁所門 Toilet Door: 開 OPEN / 關 CLOSE



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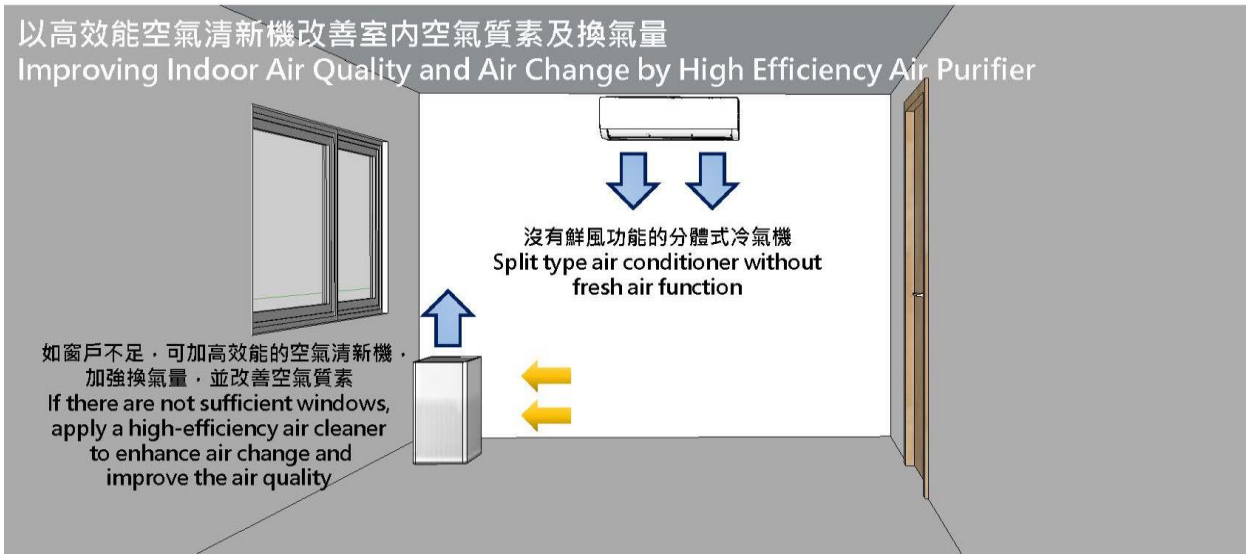
LEAKY DRAIN BUSTERS 渠漏解決師

通風系統 Ventilation System :
優質的室內環境
Quality Indoor Environment

換氣扇 Air-Conditioner	窗戶 Window at Light Well	空氣清新機 Air cleaner machine
開 ON / 關 OFF	開 OPEN / 關 CLOSE	開 ON / 關 OFF



你我如何減低病毒散播的風險

望聞問切



1. 目測檢查管道和支流管道是否破裂，連接錯誤。
2. 座廁去水有微風吹動，聞到異味。
3. 鄰居如有相同異樣，租戶/居民應與管業處詢問等等。

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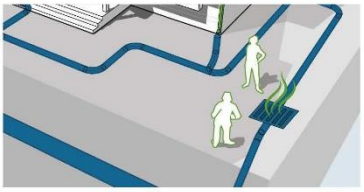
建議管業處如何減低病毒散播的風險

圖片來源: Google website/sootoon.cn




- 定期進行管道檢查，清潔和清理，以防止外部管道堵塞
- 聘請專業人仕進行檢查及有關跟進事項
- 定期進行高壓噴射和管道清潔
- 更換老化的管道和連接配件
- 建議每個巡邏點的檢查清單內加設目測管道狀況

建議裝修承建商或人員於安裝或改裝任何住户單位排水喉管工程時，必須遵守以下項目：

- 去水, 潔具, 坐廁污水, 排污等適當接駁, 避免擅自改裝去水渠
- 坐廁污水渠應適當接駁至室外的氣喉
- U型聚水器或隔氣應適當安裝
- 渠管應有適當斜水位去水、避免渠路太長、太多彎位
- 所有喉管接駁口應適當安裝封實
- 裝修垃圾泥頭石屎應棄置於指定位置，不可丟落於任何去水渠
- 當懷疑將接駁之主要喉管表面有破損、裂紋，應立即塗上防水物料，並盡快通知承建商/管業處跟進

長遠處理策略（管理支援及設施）

1. 建議設立工程技術施工人員註冊，確保裝修或維修執行渠務工作正規進行。

2. 註冊專業工程師負責監察渠務工作及提交報告

圖片只供參考

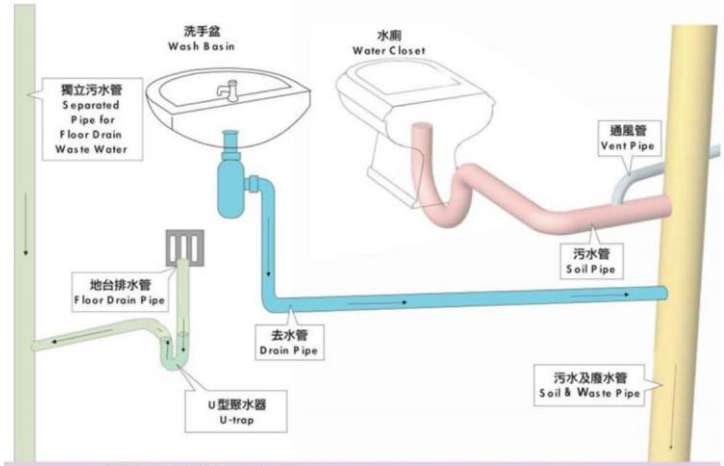
電業工程人員 ✓
註冊水喉匠 ✓

長遠處理策略（管理支援及設施）

成立基金支援向有需要大廈住戶進行渠務改善/優化工程

長遠處理策略（管理支援及設施）
長遠改善設施（1）

分開地台去水管道
減低傳播風險



圖片來源: Urban Renewal Authority

長遠處理策略（管理支援及設施）
長遠改善設施（2）

圖片來源：香港01, hket, 網上資料

排水系統通風管

- **高度：**
  高於屋頂平台約2.5 米
- **位置：**
  應遠離頂樓窗戶位置

（※按實際環境情況如風向，喉管設計及應用等等）

THE HONG KONG INSTITUTION OF ENGINEERS
香港工程師學會

Building Services Division
屋宇裝備分部

LET'S FIGHT THE VIRUS TOGETHER

Leaky Drain Busters

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