



THE HONG KONG INSTITUTE OF  
**SURVEYORS**

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Mr Marco Wu  
Director of Buildings  
18/F Pioneer Centre  
752 Nathan Road  
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Dear Marco

**Survey Findings and Recommendations on the Drainage System of Old Private Residential Buildings**

I have the pleasure to enclose copy of the summary findings of the inspections carried out to the drainage systems of eight private residential buildings in Hong Kong.

I hope the Buildings Department would consider the recommendations and implement new measures to stop similar problems from occurring in our new developments.

Yours sincerely

Kenneth CHAN Jor Kin  
President

Encl.

c.c. Mr Raymond CHAN, BSD Chairman (w/encl.)  
Mr Samson WONG, PBSCA Chairman (w/encl.)

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## Results of the Survey on Drainage Systems of Eight Private Residential Buildings

Following the release of the report on the outbreak of SARS infections at Amoy Garden, the Hong Kong Institute of Surveyors offered to inspect the drainage systems of ten residential buildings free of charge. Eight of which were inspected as at end of May 2003. The common defects/problems identified in the inspections could be summarized as follow:

### Findings

#### *Design and workmanship*

The drainage systems in all of the surveyed buildings completed before the mid-seventies were of the two-pipe design. Three of which were of the closed system whilst the other four were of the open hopper system. One of the surveyed buildings completed in the early eighties was of one-pipe design. All except two of the buildings have had their original cast iron vertical stacks changed to uPVC. The renewed stacks were in fair condition with no major leakage in the pipe shanks. Some of the renewed uPVC pipeworks were found to be out of plumb. Some branch pipes were laid with insufficient fall. These reflect the generally poor workmanship of the replacement pipeworks.

It was also generally discovered that the lowest residential floors were suffering from nuisance caused by high pressure at bends choking and blockage of the soil and waste stacks. Some of the first floor owners had even abandoned the use of the WC to obviate the disruption.

#### *General neglect of repair and maintenance*

Vegetation growth and debris at hoppers of waste water disposal systems, leakage at junctions of pipeworks, rusting of cast iron pipes, rusting of cast iron pipe sleeves, etc. were some of the common defects and problems noted during the inspections. The renewed uPVC stack pipes were generally in fair conditions. However, cast iron pipes passing through external walls were not replaced with leakage and staining of building fabric resulted. There was a general neglect in the repair and maintenance of the drainage systems especially those in enclosed lightwell situations. There was no difference in this respect whether the buildings were in the luxurious class or not. Occupiers just avoided or denied the problems by keeping windows at lightwells closed all the times.

There was no planned or regular maintenance to the installations. There was no maintenance fund set up for the replacement or repair of pipeworks. Breakdown repairs were the norm.

#### *Unauthorized alteration and substandard works*

In the one-pipe system building, a high portion of owners had changed the bathtubs to shower trays. The original water traps installed immediately underneath the bathtubs were removed for the installation of shallower shower trays. Exposing the interior to the ingress of foul air and cockroaches from the main stacks. This was a highly unhygienic situation. Some of the original anti-siphonic traps were changed to non-conforming traps during the course of resolving blockage problem.

In some of the buildings, there were a lot of alteration and addition to the



original drainage systems causing blockage and venting of the same. In one of the buildings where it was provided with an indoor hopper system, the hoppers were blocked up due to spillage and foul smell problems.

#### *Access for maintenance were lacking*

Only one of the buildings surveyed had the drainage systems accessible internally at the utility areas next to the kitchens and bathrooms. Leakage or defects could be detected and remedied more readily. Other buildings were having the drainage systems mounted on the outside of the external walls. Regular inspections and routine maintenance could not be easily carried out as access to the system was a problem. The absence of appropriate access discouraged owners to effectively and economically inspect and repair the drainage systems.

### **Recommendations**

With the above findings and observations, we would wish to make the following recommendations for consideration by the authority:

#### *Easy bends at change of direction of pipings*

Due to headroom restriction, many of the downpipes turned at sharp angles at the lowest floor before finding their discharge into the underground sewers. Sometimes these downpipes would be enclosed in areas other than those accessible from common areas. It was difficult to carry out inspections and repairs. Suitable easy bends must be adopted for pipeworks installations where there is a change in direction of flow. Residential downpipes must be accessible from common areas when they pass through the podium floor(s).

#### *Separate system for lower floors*

To avoid nuisance to occupiers of lower floors, a separate system should be introduced for the lower floors the extent of which should be determined depending on hydraulic calculation of the proposed drainage systems.

#### *Mandatory inspection and maintenance*

As voluntary maintenance of the building and drainage system to maintain safety and hygiene was not observed, it is time to introduce mandatory inspection and maintenance for dilapidated buildings. Buildings completed in the last ten to fifteen years were generally well looked after with proper management and maintenance. It is those older buildings that are without proper management would have to be zero in for immediate action. Their unsafe and unhygienic conditions are affecting the well being of the wider immediate neighbourhood. To make this process more focused, a non-governmental voluntary scheme could be introduced to classify existing buildings in accordance with their state of repair, maintenance and hygiene. No buildings could be classified safe and hygiene if they are not properly maintained. These buildings must then be targeted for action.

#### *Drainage alteration works to be carried by Minor Works Contractors*

Under the current provision of the Buildings Ordinance, drainage renovation works would be considered exempted works. Many of the alteration works



carried out were in violation of the regulations. It is proposed that any works to be carried out to existing drainage systems must be effected by registered contractor. A separate class of minor works contractors on drainage works might have to be created for the above purpose. The above exempting provisions might have to be amended to give effect to this proposal.

*Access for maintenance*

Suitable sized indoor pipe ducts with access from common areas should be the preferred arrangement so as to ensure that inspection, repair and maintenance could be carried out more readily. Pipe ducts without access from common areas should be banned altogether.

In the cases that drainage installations are to be mounted on the outside of the external walls, simple access platforms or gondolas would have to be provided before they are approved. Authorized persons should be asked to demonstrate accessibility of the drainage system with their submission of drainage plans for approval.

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