

INFECTION CONTROL WITHIN THE BUILT ENVIRONMENT

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The outbreak of atypical pneumonia, called Severe Acute Respiratory Syndrome (SARS), has highlighted the importance of hygienic living environments. SARS has revealed the pressing need for research on possible solutions which take account of the numerous factors that may contribute to the spread of infection in multi-storey residential buildings, commercial and hospital buildings.

The outbreak of SARS at Amoy Gardens in March 2003 has highlighted that a major cause of transmission of disease can result from the sewage system and the architectural design of residential buildings. At Amoy Garden, the building's sewage system and design of the skywells meant that when leakage occurred in a quasi-confined space this provided a favourable virus transmission area. The consistent updraft of air in the skywell facilitated the travel of the virus to the upper floors of the building¹.

It is natural therefore that our research should initially focus on drainage and sewage systems. Hong Kong is considered as having a world class design standard for building sewage systems but new designs need to be considered. Just as important are management and maintenance issues. Even a brief visual inspection shows that leaks are readily apparent in sewage pipes, particularly in old buildings. Dry U tubes are a major channel to emit contaminated water vapor which may carry virus throughout the building resulting in cross-infection of many residents. Given the number of existing high rise buildings in Hong Kong and their high density, maintenance and repair of these systems need serious consideration.

Existing defects result mainly from lack of management procedures for monitoring the performance of these facilities and weak maintenance regulations. Research such as that already initiated and completed² has looked at reducing the risk of spreading the SARS virus. These issues demand consideration of the building product, processes and people. The overall system is only as strong as the weakest link.

Looked at in a wider context the main issue is one of ‘Infection Control’, how do we ensure prevention of the spread of infection through monitoring, detection, isolation, containment and eradication? This then should be the focus of a combined initiative by all the disciplines within the Built Environment? Within the Faculty of Construction and Land Use, we have colleagues with research expertise in not only plumbing and drainage but also modelling airflow; airflow quality; building performance assessment; measurement; risk analysis; 3D modelling; the management of buildings; business continuity management, information modelling and intelligent buildings. Other universities, research teams, professional bodies and business organizations will have both similar and related expertise.

The challenge now is to find short, medium and long term solutions to infection control, to cover all aspects of design in the Built Environment from the Urban Planning, Architectural and Building Services Design issues through to the procedures, processes and human factors of building operation and management. Cultural and social issues also need to be addressed. Clearly hospital buildings are a special case that demand closer focus because of the higher building specifications and operational specifications required.

As with all other universities and research institutions in Hong Kong the Faculty of Construction and Land Use has already commenced initiatives to identify possible solutions to infection control. We have already worked successfully with government, professional institutions and commercial organizations. We are currently in negotiation with professional bodies and industry groups on future projects. We welcome the opportunity to work with others to address these research issues and formulate an adequate basis for effective infection control methods and a safer Built Environment.

References

1. Lam K.S., (2003), Investigation of Transmission Path of SARS in Amoy Garden, Internal Paper, Faculty of Construction and Land Use, The Hong Kong Polytechnic University.
2. Pih, P. et al, (2003), Prevention and Reducing Risk of Spreading SARS Virus in Buildings via Building Services Systems, a position paper produced by the Building Services Operation and Maintenance Executives Society.