

## **Transmission Routes, SARS Wards and Healthy Buildings – The Needs for Interdisciplinary Research**

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We have been involved in at least two SARS related projects, i.e. to establish the virus transmission routes in the recent major SARS outbreak in Amoy Gardens and to understand how we can design and build SARS wards with effective ventilation and air conditioning systems.

Based on thermo-fluid dynamics analysis, computational fluid dynamics simulation and laboratory and field measurements, our preliminary research findings have identified the major virus source from the drainage stacks and revealed a strong correlation between the infection pattern and air flows in the re-entrant, air flows between flats in Block E, and wind flows between blocks. Further research will establish the virus transmission routes with solid evidences and analyses.

A full-scale SARS ward test room has been recently built in our Building Services Laboratory and used to study effective air conditioning systems and local exhaust in hospital wards. We have been assisting a group of engineers led by Hong Kong Institution of Engineers to carry out a mock-up study of a specific air conditioning system design. Some basic design principles and our smoke visualization results will be discussed.

Our experience in these two projects has clearly demonstrated the needs of interdisciplinary research. Engineering research can at least contribute to the following research areas:

1. the study of virus transmission routes in major super spreading events,
2. improvement of ventilation effectiveness in hospitals, in particular SARS patient wards and ICUs,
3. characterization of bioaerosols and water droplets, understanding of breathing flows,
4. design of healthy buildings including effective building services such as drainage systems etc.