

Architectural Studies of Environmental Conditions at Amoy Gardens

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The scope of our work is to study, by means of computational fluid dynamics (CFD), the potential for “exhaust air reentry” problem caused by the vertical flow inside the reentrant area. Specifically, we are studying the potential for air and water droplets to circulate from one flat to another. Soon after the outbreak was recognized, questions were raised as to whether the virus might be airborne or transmitted through air movement. If it were, we might find a correlation between air flow and the spread of the disease. We limit our scope to the study of air flow surrounding the building block and inside the flat units, especially the air movement of the reentrant area. The outcomes of this investigation provide supplement information to the HKSAR and WHO Amoy Gardens investigation report regarding the environmental aspect contributed to the outbreak of Block E.

Hong Kong’s Extreme High Density Living Environment

The outbreak of SARS has highlighted the need for critical attention to the design of housing in Hong Kong’s extreme high density environment. Design of housing is generally concerned with accommodating daily routines of life and public interaction. Hong Kong’s extreme high density renders it a fundamentally different problem than housing in general. While at low densities there is much that can be taken for granted, in Hong Kong the design of every part critically affects innumerable others. Tolerances for mistakes are very limited. The consequences of errors, however small, can rapidly cascade into unpredictable failures. Design at such densities is indeed the design of “a machine for living”. It is a highly complex machine, and there is little that can be designed from a singular point of view, such as technical, aesthetic, or commercial.

The urban fabric and the housing are sometimes shaped with less than a comprehensive view of a balanced and sustainable human environment. Its limits and tolerances are often not sufficiently understood. In most other cities, the pattern of air movement from one window to a neighboring one or the leak in a drainage pipe would each have a minimal and readily identifiable effect. But in these conditions of extreme complexity, they can trigger a chain of effects far beyond themselves and their immediate location. The SARS crisis makes this point painfully clear. It makes the point in terms of the effect that a failure bears on the economy and the ultimate loss in human terms: loss of life. The scale and the collective loss as a result of such failure are inestimable in every term. The policies that regulate the future of housing and the development of the city ought to embody a better informed and more far-sighted vision than what has thus far directed the shaping of Hong Kong.

Building Aerodynamics for Sustainable Quality Urban Living

- a) To apply CFD to the design and planning of the urban environment.
- b) To research and promote design strategies to improve natural ventilation, especially with regard to: energy conservation; indoor air quality; indoor thermal comfort; and external wind comfort in public open spaces.
- c) To investigate the flow of pollutants and airborne particulates, especially in the reentrant spaces of high-rise housing blocks, and to identify design strategies to avoid backflow into neighboring inhabited spaces.
- d) To investigate relationships between urban air flow and public health.