

Assessment of airwell performance in singlestorey terraced houses

ABSTRACT

Single-storey terraced housing in Malaysia does not provide thermal comfort to its occupants due to poor dissipation of heat from solar irradiation unless mechanical cooling is installed, which adds to the urban heating island problem. This study is a simple assessment of natural ventilation performance of terrace houses which by law are built with an airwell and sized according to regulations. A typical room of 3 m · 4 m · 3 m with an adjacent airwell has been investigated by CFD simulation assuming ambient temperature of 30· C and atmospheric pressure of 101.3 kPa. The results show that with an airwell-chimney of 2.55 m above the roof the test room air velocity could reach 0.6 ms⁻¹ for thermal comfort; while without the protruded chimney adverse cold inflow set in, and the indoor air flow velocity ranged from as low as 0.08 ms⁻¹ to 0.21 ms⁻¹ . However, when the protruded chimney was not installed, but with a wiremesh-based blocker of adverse cold inflow installed on the airwell outlet, the indoor air flow velocity consistently reached 0.2-0.3 ms⁻¹ , which was about 45% higher than that without the blocker, and was within the recommended range for thermal comfort. The wiremesh blocker of adverse cold inflow could be an option to ventilate effectively single-storey terrace houses without the need of installing tall chimneys.