

The Evaluation of Design Guidelines for Stratum Ventilation in the Tropics

Prepared by: Liew Hui Jin

ABSTRACT

Building ventilation is highly used and rated at one of the highest energy consuming categories. Numerous efforts have been done to reduce energy usage and thus the evolution of green buildings. However, the conventional design has generated plenty comfort and health related issues. Stratum ventilation has been studied from 2009 and the potential of the design for thermal comfort is regarded as good compared to existing designs like the ceiling-based or the under-floor design. INTI International University takes part as study field for simulation model to evaluate stratum ventilation for airflow patterns, velocity profile, temperature, relative humidity and also local mean age. A small room (W4m x L5.15m) and a medium size room (W7.85m x L9.2m) has been modelled and simulated with FloEFD software to understand the stratum potential. Prior to that, the flow of air and velocity of air has been determined using design guidelines and standards that limit the design of stratum ventilation. The overall result of the models is acceptable as the thermal comfort when evaluated using the Fanger's Model of PMV-PPD Model. Occupant's breathing zone is evaluated and PMV Index based on ASHRAE Thermal Comfort Tool has shown majority of the occupants are within the cool region between -0.3 up to -1.3. The local mean age of air for medium size room is ranging from 250s to 300s while small room from 60s to 120s. According to the results, the thermal comfort using stratum ventilation in a tropical country is acceptable.