ABSTRACT

Basement car park in a building in Singapore is a common phenomenon in the land scarce country like Singapore. It is a statutory requirement that generally all basement car park shall be mechanical ventilated with an air change of 6 per hour. In our tropical climate, the Basement Car Park built is usually very warm and humid.

The objective of this project is to analyse the human thermal comfort in a Mechanical Ventilated Basement Car Park. It is found that the 2 important factors required for the study are the determination of ventilation techniques for the analysis and the criteria of Thermal Comfort. Computational Fluid Dynamics (CFD) simulation, probably the most versatile of all the techniques for studying ventilation is adopted as the tool for analysis. Researches are also made from various international standards on the criteria and measurement of Thermal Comfort. The ASHRAE Standards of Thermal Sensation Scale of measurement is eventually selected as a tool.

In this project, a total of 16 simulations based on various Car Park Layouts and Conditions are simulated using Fluent. From the results and analysis, it is found that in our high outdoor air temperature and environment, it is difficult to achieve thermal comfort. However, from the analysis, it is also found that the layout of mechanical system has a significant effect on the temperature and air movement in Basement Car Park. With good design, we can provide a balanced ventilation system in the Basement Car Park in our tropical climate.