ABSTRACT.

Indoor Air Quality has been a major issue in Air-conditioned building over the last two decades. Under Floor Air-Conditioning (UFAC) system in Office spaces are very popular in European countries due to their inherent nature in delivering a good Indoor Air Quality (IAQ) than the conventional Air-conditioning system. UFAC system supplies air from the floor and extracts the air from the return outlets in the ceiling. By this process, contaminants are removed from the occupied zone and the occupied space has a better IAQ. In Singapore, UFAC systems are very rare and few studies have been done to investigate the IAQ and thermal comfort performances of this type of system.

This dissertation aims to explore the ability of UFAC system in providing Thermal comfort and good IAQ by conducting experiments in two office spaces in a high-rise office building. Spot measurements were done at five different heights from the raised floor, which includes the thermal comfort parameters, microbial count, dust particles and the concentration of carbon dioxide (CO₂), carbon monoxide (CO), total volatile organic compound (TVOC). In addition, air exchange rate, ventilation effectiveness and age of air were measured. To substantiate these measurements the same spot measurements were done in an office space that was served by a conventional air-conditioning system.
Results of the case studies show that good IAQ was achieved in the offices served by UFAC system but the acceptable level of thermal comfort was not achieved. Comparison between offices served by UFAC system and office served by conventional Ceiling Based Air-Conditioning System showed a preference towards CBAC system in offices.