Air movement and perceived air quality

The impact of air movement on perceived air quality (PAQ) and sick building syndrome (SBS) symptoms was studied. In total, 124 human subjects participated in four series of experiments performed in climate chambers at different combinations of room air temperature (20, 23, 26 and 28 °C), relative humidity (30, 40 and 70%) and pollution level (low and high). Most of the experiments were performed with and without facially applied airflow at elevated velocity. The importance of the use of recirculated room air and clean, cool and dry outdoor air was studied. The exposures ranged from 60 min to 235 min. Acceptability of PAQ and freshness of the air improved when air movement was applied. The elevated air movement diminished the negative impact of increased air temperature, relative humidity and pollution level on PAQ. The degree of improvement depended on the pollution level, the temperature and the humidity of the room air. At a low humidity level of 30% an increased velocity could compensate for the decrease in perceived air quality due to an elevated temperature ranging from 20 °C to 26 °C. In a room with 26 °C, increased air movement was also able to compensate for an increase in humidity from 30% to 60%, but not to 70%. The elevated velocity of recirculated polluted room air did not decrease the intensity of SBS symptoms, but movement of clean, cool and dry air did so. Energy-saving strategy of improving occupants’ comfort in rooms by moving room air at high velocity and maintaining room temperature high at reduced supply of outdoor air or by a decrease of indoor air enthalpy should be cautiously implemented in buildings because the pollution level may still cause negative health effects. © 2011 Elsevier Ltd.