Air distribution in a multi-occupant room with mixing or displacement ventilation with or without floor or ceiling heating - DTU Orbit (08/11/2017)

Air distribution in a multi-occupant room with mixing or displacement ventilation with or without floor or ceiling heating
This study performed a comparative analysis of the air distribution in a multi-occupant room with mixing or displacement ventilation and the effect of adding floor or ceiling heating to each of them. The vertical distribution of indoor air temperature and velocity in the occupied zone and the horizontal distribution of indoor containment concentration in the breathing zone were measured for all six systems with a supply air temperature of 19.0°C and an air change rate of 4.2 h^{-1}. The results showed that the mean vertical air temperature difference in the occupied zone varied from 0.1°C to 0.6°C; the mean local turbulence intensity varied from 12.0% to 14.1% with mixing ventilation with or without floor or ceiling heating, and the corresponding values were 1.5°C to 2.5°C and 7.3% to 9.8% with displacement ventilation with or without floor or ceiling heating. Mean air distribution effectiveness varied from 0.93 to 1.0 for mixing ventilation and from 1.06 to 1.14 for displacement ventilation with or without floor or ceiling heating. The results are relevant to the design and control of mixing and displacement ventilation with or without floor or ceiling heating in a multi-occupant room.

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