Thermal Comfort Study in Portuguese Elderly Care Centers

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Abstract

Thermal environment in homes does not usually cause serious illness however it has a very significant impact on the general well-being and daily performance of its residents. Poor thermal environment can also aggravate the impact of air pollutants on occupant's health. This study was performed in 71 elderly care centers rooms both in winter and summer season. Thermal comfort parameters were measured following ISO 7730:2005, included relative humidity (RH), temperature and air velocity in order to determine predicted mean vote (PMV) and predicted percent of dissatisfied people (PPD) indexes. Mean radiant temperature, PMV and PPD indexes and the respective measurement uncertainties were calculated by Monte Carlo Method. The analyzed elderly care centers were naturally ventilated with no cooling systems apart from some passive measures, such as blinds and curtains on the windows. Our results point out that, due to poor insulation, the winter season TC parameters and indexes are not within the class A of ISO 7730:2005 reference (PMV: [-0.2; 0.2]; PPD: < 6 %). Also there are significant differences by season between PPD (P = 0.033) and PMV (P = 0.001) indexes when assessing the same rooms. In natural ventilated environments with poor insulation, the maintenance of a comfortable indoor environment for elderly populations can be a substantial challenge, especially in winter season.