Adaptive Thermal Comfort vs Energy Efficiency in Portuguese Buildings

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Abstract

Portuguese building thermal regulations, as well as in many other countries, define indoor thermal comfort conditions in a static way, assuming constant winter and summer comfort temperatures. Meeting these controlled comfort temperatures is only possible if buildings are equipped with air-conditioning (AC) systems, even in a temperate Mediterranean climate like the Portuguese one.

Portuguese one. So, Portugal has experienced in the last decade a clear changing trend towards the installation and use of AC systems in buildings, thus contributing to the increase of energy consumption in the sector. The current policy to reduce CO2 emissions related to these consumptions is to increase the efficiency of equipment.

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personal adaptation). To support this approach an adaptive thermal comfort model was developed based on extensive field surveys carried out in occupied buildings in Portugal.

Field surveys were based on assessment of occupant' comfort perception and measurement of indoor and outdoor conditions.

Developed adaptive model consider climate conditions, traditional ways of living in and “using” buildings, users’ expectations, and major changing social, economic and psychological factors. The implementation of adaptive thermal comfort model could contribute to a more rational and sustainable approach to building design and operation, thus leading to a great potential for reducing the use of air conditioning and increasing occupant’s comfort perception.

This paper presents the development of this model and its added value in sustainable energy policy.

Keywords

Thermal comfort, Adaptive model, Energy Efficiency.