

12. Upgrading of Control Functions of Passive Rhythmic Air-Conditioning System

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Passive rhythmic air-conditioning is the technology to reduce the energy required for air conditioning without compromising comfort by turning air conditioning on and off at certain time intervals so as to cause rhythmic changes in temperature. The on-off control of the conventional passive rhythmic air-conditioning system is based on indoor air temperature only. It may be possible, therefore, to further reduce air conditioning time by taking account of humidity as well as temperature. As a possible means of doing that, the authors turned attention to a control method using the time average of the predicted mean vote (PMV), an index that takes both temperature and humidity into consideration. In these means, timeaverage of PMV is estimated from continuous temperature and humidity monitoring results and defined thermal factors such as metabolism. And by turning air conditioning on and off according to the time average of PMV, further reducing air conditioner operation time is realized under the conditions where humidity enhances comfort. This paper reports on the improvements made in the system control method and the energy-saving effect that can be achieved by the improved control method.

Key words: passive rhythmic air-conditioning system, energy harvesting, temperature and humidity, predicted mean vote