Distributed Control Architecture of Semi-Passive Cooling System Based on Smart Sensor Technology

何宗軒、林志哲

E-mail: 9608236@mail.dyu.edu.tw

ABSTRACT

The problem of global warming is more and more serious, The problem of global warming is threatenning the future of mankind, the renewable energy of environmental protection is valued.The global warming is carbon dioxide and other glasshouse air to exhaust the Earth atmosphere to cause, tying up the thermal energy of sunlight, causing the permafrost temperature rise. Greenhouse Gas is more many, the permafrost temperature will be more high.Using all of all-new policies, such as high-efficiency energy, renewable energy and economy energy...etc. is the methods which solves a global warming.Much science and technology has already existed early, can use to resolve a world warming a problem.In this experiment, with passive type cooling space structure also match an active type fan, then reach the hot comfort in this space structure to match it mainly with ISO 7730 with ASHRAE 55 two kinds of standard is basis of the indoor hot comfort(Thermal comfort) equally predicts index sign PMV. (Predicted Mean Vote)This active type fan is also controled with PWM(the Modulation of the Pulse Width, the vein wave width adjusts to change), according to experiment space structure inside it the temperature sensor obtains the quantity of temperature to be used as adjustment, then make this half passive type cool off the space structure reach efficiency and its comfort that it should have.

Keywords : Predicted Mean Vote, Predicted Mean Vote

Table of Contents

REFERENCES

[1] 馮世廷，“冷房舒適度之自我適應控制”，大同工學院機械 工程學系，1995 [2] 陳威智，“無段風速冷房舒適度控制”，大同工學院機械工 程學系，1997 [3] 邱繼哲，“建築物及生物成長設施之誘導式通風冷卻設計研 究”，國立台灣大學生物環境系統工程學研究所碩士論文， 2002 [4] Gan, G (2000) Numerical evaluation of thermal comfort in rooms with dynamic insulation. Building and Environment. 35, 445-453.

[5] Hirunlabh, J., Kongdung, W., Namprakai, P., Khedari, J. (1999). Study of natural ventilation of houses by a metallic solar wall under tropical climate, Renewable Energy.18, 109-119.

[6] 黃漢泉 編著（1997年7月）。〈超省能大樓—日本大林組技術 研究所本館之介紹〉。《建築師》，1997-7月號，頁56-61。台北 市:中華民國建築師公會全國聯合會雜誌社。

[7] 葉歆 編著（1997）。《建築熱環境》。台北市:淑馨。ISBN: 957-531-573-1。

[8] ASHRAE, ASHRAE Standard 62- Ventilation for acceptable air quality,American Society of Heating, Refrigerating and Air-Conditioning

Engineers, Atlanta, 1989.
[9] ASHRAE, “ Physiological Principles, Comfort, and Health, ” ASHRAE Handbook of Fundamental, Chapter 8, 79-88, 1989.
[10] ASHRAE, ASHRAE Standard 55- Thermal Environmental Conditions for Human occupancy, American Society of Heating, Refrigerating and Air-Conditioning Engineers, Atlanta , 1992.
[11] ASHRAE, “ Thermal Comfort, ” ASHRAE Handbook of Fundamental, Chapter 8 , 37-55, 1997.
[12] ASHRAE, ASHRAE Standard 62- Ventilation for acceptable air quality, American Society of Heating, Refrigerating and Air-Conditioning Engineers, Atlanta, 1999.
[13] Fanger, P. O., Thermal comfort, McGraw-Hill book company, 1972.
[14] Fanger, P. O., “ Calculation of thermal comfort:Introduction of a basic thermo comfort equation, ” ASHRAE Trans, Vol. 73, 263-271, 1967.
[15] ISO, “ Indices for Thermal Comfort, ” ISO Standard 7730, New York, 1984.
[16] McNall, P. E., Jaax, J. and Rohles, F. H., Nevins, R. G., “ Thermo comfort(thermally neutral)conditions for three levels of activity, ” ASHRAE Trans, Vol. 73, 143-150, 1967.
[17] Nevins, R. G., Rohles, F. H., Springer, W. and Feyerherm, A. M., “ Temperature-humidity chart for thermo comfort of seated persons, ” ASHRAE Trans, Vol. 72, 283-291, 1966.
[18] 原田隆司，“ 衣服的快適性和感覺計測 ”，纖維製品消費科 學，第36卷，第24頁，日本，1996。
[19] Serra, R., Les energies a l'arquitectura, Edicions UPC, Barcelona, Spain,57-73, 1995.
[20] Khedari, j., Yamtraipat, N. and Pratintong, N., Hirunlabh, J., “ Thailand ventilation comfort chart, ” Building and Environment, Vol. 32, 245-249 ,2000.
[21] Fergus, N., “ Survey of Thermal Comfort in Pakistan: Towards New Indoor Air temperature Standards, ” 113-121, 1994.
[22] 黃國樑 譯（1983 年5 月）。〈建築自然冷房技術簡介〉。《建 築師》，1983-5 月號，頁29-33。台北市:中華民國建築師公 會全國聯合會雜誌社。
[23] 江哲銘（1997）。《建築物理》。台北市:三民書局。ISBN: 957-14-2400-5。
[24] Bradshaw, V. (1993). Building Control Systems. Wiley & Sons, Ltd.
[25] Incropera, F. P., Dewitt, D. P. (1996). Fundamenttals of heat and mass transfer. John Wiley & Sons, Ltd. ISBN:0-471-30460-3.
[26] 蔡尤溪，「國內外IAQ現況及防治技術」，能源、資源與環境 季刊，第79~83頁，台北，1996。
[27] Anderson,B.(1990). Solar building architecture. MIT. ISBN:0-263-01111-5.
[28] 洪增淵，“ 演講廳之室內環境品質調查與分析 ”，朝陽科技 大學環境工程與管理系，2004