

Accepted Manuscript

A model-based air balancing method of a ventilation system

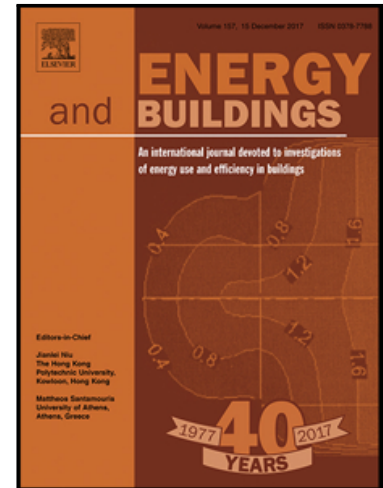
Gang Jing, Wenjian Cai, Deqing Zhai, Shuai Liu, Can Cui

PII: S0378-7788(18)31017-X
DOI: [10.1016/j.enbuild.2018.06.044](https://doi.org/10.1016/j.enbuild.2018.06.044)
Reference: ENB 8646

To appear in: *Energy & Buildings*

Received date: 30 March 2018
Revised date: 20 June 2018
Accepted date: 21 June 2018

Please cite this article as: Gang Jing, Wenjian Cai, Deqing Zhai, Shuai Liu, Can Cui, A model-based air balancing method of a ventilation system, *Energy & Buildings* (2018), doi: [10.1016/j.enbuild.2018.06.044](https://doi.org/10.1016/j.enbuild.2018.06.044)



This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

A model-based air balancing method of a ventilation system

Gang Jing^a, Wenjian Cai^{b,*}, Deqing Zhai^b, Shuai Liu^c, Can Cui^b

^a*School of Transportation and Logistics Engineering, Shandong Jiaotong University, Jinan 250023, PR China*

^b*EXQUISITUS, Centre for E-City, School of Electrical and Electronic Engineering, Nanyang Technological University, 50 Nanyang Avenue, Singapore 639798, Singapore*

^c*School of Control Science and Engineering, Shandong University, Jinan 250061, PR China*

Abstract

In this paper we propose a novel and easily implementable model-based air balancing method for a ventilation system. The proposed method provides a well-defined form of balancing for a ventilation system, which can be effectively solved. The method follows three procedures: i) mathematical modeling for duct system which is based on steady-state pressure balance; ii) model parameters identification by supervised machine learning; iii) determination of damper positions based on the model. The performance of this method is validated through testing in a duct testbed with five terminals. The results show that the final flow rates in all terminals match with the desired values with no more than 6.8% relative error.

Keywords: Ventilation system, air balancing, model-based method, parameter identification, optimization, experiment.

1. Introduction

Heating, ventilation and air-conditioning (HVAC) is designed to satisfy the thermal comfort and indoor air quality for occupants in residential, commercial, and industrial buildings. There are some basic requirements for fresh air and

*Corresponding author
Email address: ewjcai@ntu.edu.sg (Wenjian Cai)

Download English Version:

<https://daneshyari.com/en/article/6727525>

Download Persian Version:

<https://daneshyari.com/article/6727525>

[Daneshyari.com](https://daneshyari.com)