

BUILT ENVIRONMENT AND PUBLIC HEALTH

— Proceedings of BEPH'2004

Editors:

Guoqiang Zhang

Xuesong Hou

Jilin Yang

Liwei Tian

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China Environmental Science Press

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PREFACE

It is our great pleasure to host the 2nd International Conference on Built Environment and Public Health (BEPH2004) on December 6-8, 2004, Shantou, China.

This conference is the continuation of the first conference that was held in Changsha, China in December, 2003. This series of conference were initialized by Chinese Society of Environmental Sciences, Hunan University and other organizations in China, sponsored by number of international and national organizations of China, aiming at providing a platform for academic exchange and knowledge transfer for researchers, practitioners in the multidisciplinary field of built environment and public health. Professionals from architecture, HVAC engineering, building material, public health, environment monitoring, environmental science and engineering had good exchange in their research work and understanding in the related field in the first conference, which made it a successful one.

The Proceedings contain about 100 papers that have been reviewed by our members of Programming Committees and other experts. These papers have been from 10 countries and regions in the field of built environment and public health. Some of the papers represent the most recent advances in the field worldwide, most of the papers reflect the advances in related field in China, where the research and practice in the field of built environment and public health has been developing more quickly than ever before.

We are very grateful to the valuable help and enthusiasm received from members of the International Coordinators, Program Committee and the generosity of the Co-organizers, the Sponsors, the Co-sponsors and the Supporters in various forms.

Chairman, BEPH 2004

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Contents

1. IAQ & Indoor Pollutants

Managing Indoor Air Quality – The Hong Kong Experience <i>Alfred L C Yu, Alain K L Lam</i>	1
A Pilot Study on VOCs and Carbonyl Compounds in Chinese Residences -Personal Exposure and Cancer Risk Assessment - <i>Yueyong Ni, Kazukiyo Kumagai, Hiroshi Yoshino, Yukio Yanagisawa</i>	5
Investigation on Indoor Air Quality and Air Cleaner Testing in Taiwan District <i>Chung-Shin Yuan, Yu-Juan Wu, Cho-Ching Lo</i>	10
Improvement of the Breathing Spot Air Quality <i>Jingtao Zhang</i>	16
Characteristics of Indoor Air Pollution and Prevention Countermeasures in Shenzhen City <i>Kangsai Zhao, Xiaofeng Peng, Xiaolan Zhong</i>	23
Coefficient of Mean Deviation of Indoor Pollutant Concentration and Indoor Air Quality Evaluation <i>Xing Gao, Fenglin Yang, Xingwen Zhang, Xiaochen Xu</i>	28
Analyzing the Bacterial Density in Air-Conditioned Wards <i>Aiping Zheng, Jianxia Li</i>	36
Monitoring and Analysis of Total Volatile Organic Compound <i>Qinqin Deng, Deying Li, Shuyuan Pan, Xuejun Hao, Yongzheng Shi</i>	40
Exposure Assessment of Polycyclic Aromatic Hydrocarbons Using Urine 1-OHP Metabolites of Housewives in Korea <i>Yoon Shin Kim, Seung Cheol Hong, Tae Hyung Lee</i>	46
Review of Indoor Air Quality Research in Korea <i>Yoon Shin Kim</i>	47
Developments of Toxicological and Physiological Studies on Air Formaldehyde <i>Xu Yang, Shumao Ding, Zhisong Lu, Yi Cao</i>	48
The Effect of Formaldehyde on the Proliferation of Cultured Cells <i>Shumao Ding, Li Wang, Lingling Hou</i>	49
Research on Formaldehyde Pollution in Indoor Air During 2001-2003 in Beijing <i>Qiyue Zhao, Tao Lin</i>	50
Photocatalyst TiO ₂ Loaded on An Activated Carbon Installed in Air Cleaner for Air Purification <i>C.H. Ao, S.C. Lee</i>	54
VOCs Investigation in Residential Environment in China <i>Cong Zheng, Guoqiang Zhang, Liwei Tian</i>	59

TVOC Emissions and Elimination from an HVAC-System <i>Zhisheng Li, Guoqiang Zhang, Jianlong Liu</i>	64
Study of Indoor and Outdoor Air Pollutants beside the Trunk Road in City <i>Daofang Zhang, Xiaojing Huang, Xiaoyan Yang, Xiaodan Ma, Jianbing Liu, Jun Weng</i>	68
The Summarization of Sampling Tube in Indoor Air Testing <i>Xiaohua Qi, Xiaoyi Wang, Xingtao Lin</i>	75
Removal of Indoor Formaldehyde with Ozonization <i>Yuhua Li, Kun Wang, Qingliang Zhao</i>	82
The Monitoring NAD Analysis of Formaldehyde in the Student Dormitory Rooms and New Decorated Flat <i>Huisheng Zhuang, Xuyuan Wu, Mingcui Zhang, Chun Zhou</i>	88
Indoor Air Quality and Model of Degradation of Nano-TiO ₂ Air Purifier <i>Yan Lu, Shenghong Feng</i>	92
Study on Ultraviolet Germicidal Irradiation against SARS in Air Conditioning System and Upper Room in Tianjin, China <i>Jincheng Xing, Shusen Liu, Guangbei Tu</i>	99
Study on Synthetic Technology of Aminosulfonic Acid-based Superplasticizer with Low Residual Content of Phenol and Formaldehyde <i>Xinyuan Jiang, Xueqing Qiu, Xinping Ouyang, Dongjie Yang</i>	105
Verify the Test System of Indoor Harmful Air Numerical Simulation <i>Xiangyang Li, Dong Xie, Hangqing Wang, Changyi Wu</i>	112
Pollution Characteristic and Control of the Iron Oxide Red Powder Workshop <i>Lin Liu, Haibo Li</i>	118
Research on the Building Indoor Air Quality's Functional Classification and Its Changing Prediction <i>Jing Yuan, Jihong Han, Xiaodong Xie</i>	122
Indoor Environmental Pollution State & Controlling Measures of Guangdong Province <i>Jianlong Liu, Guoqiang Zhang, Liwei Tian, Jie Han</i>	127
Analysis of Indoor Environmental Quality in some Domiciles and Office Buildings in Guangzhou City <i>Diqin Hu, Daming Zhu, Yingwen Li, Songchuan Zhang</i>	133
Analysis of Indoor Environmental Pollution by Electromagnetic Radiation <i>Jinhua Li, Shibin Geng</i>	139
Study on the factors Affect Variation of Indoor Air Formaldehyde Concentration <i>Kun Wang, Wenpu Li, Qingliang Zhao, Yuhua Li</i>	144
Problems in the Implementation of Indoor Air Quality Standard <i>Xingtao Lin, Xiaoyi Wang, Xiaohua Qi, Jingqiang Zhao</i>	149

Control Countermeasure of Indoor Air Pollution of Residence <i>Yanjun Hu, Guohui Feng, Guojian Li, Guangyu Cao</i>	154
Discussion upon the Causes and Solution on Deterioration of Indoor Air Quality in Supermarkets in Winter <i>Gang Chen, Huimin Li, Weili Gu</i>	161
Ultraviolet Germicidal Irradiation System Design to Improve the Indoor Air Quality <i>Shicai Sun, Zhaozhi Gu, Zhongxin Song</i>	165
Investigation on Indoor Air Pollution of Changsha <i>Jianlong Liu, Guoqiang Zhang</i>	171
The Cause Studies of Indoor Air Formaldehyde Pollution in Huhhot <i>Ruimei Han, Jinyu Yang</i>	176
Apply Grey Relating Method to Evaluate Indoor Air Quality <i>Jie Han, Jinwen Zhang, Guoqiang Zhang</i>	183
A New Method, C-history Based Sink Effect Method, of Determining Key Physical Properties of VOC Emission from Dry Building Materials <i>Yinping Zhang, Xiaoxi Luo, Xinke Wang, Haidong Zhen, Ying Xu</i>	187
Fuzzy Evaluation of IAQ <i>Ping Dai, Xiaoyan Liu</i>	197
The Characteristics of Indoor Air Pollution in Different Rooms <i>Liwei Tian, Guoqiang Zhang, Jianlong Liu, Cong Zheng</i>	203
A Study on Indoor Air Quality of Urban Residential Buildings in China <i>Hiroshi Yoshino, Junhong Zhao, Yasuko Yoshino, Kazukiyo Kumagai, Yueyong Ni, Zhenhai Li, Jing Liu, Takayuki Shigeno, Hiroyuki Miyasaka, Yukio Yanagizawa</i>	208
2. Thermal Environment & Thermal Comfort	
Humidity Control of Residential Buildings in Hot Summer and Cold Winter Zone in China <i>Xiaoping Yu</i>	216
Issues in Management of Indoor Thermal Environment and Intelligent Monitoring System Design <i>Jie Zheng, Ling Han</i>	222
Investigation of Thermal Environment and Analyzing for Energy Saving in Residential Building <i>Li Li, Xiangdong Xue, Xiuying Pei</i>	227
Research of Classroom's Thermal Environment in Summer in Chongqing <i>Mingzhi Luo, Baizhan Li, Qunying Cheng</i>	233
Solar Thermal Simulations of Buildings in Cold Climates Using Transparent Insulation <i>N. D. Kaushika, Pawan Kumar</i>	238
The Effect of Indoor Wall Temperature on Thermal Comfort	

<i>Junping Fu, Zuoyang Ning, Xinyuan Zou, Yu Tao.....</i>	249
An Integrated Zonal Model to Predict Transient Indoor Humidity Distribution	
<i>Hui Zhao, Hongyu Huang, Fariborz Haghighat.....</i>	252
Comfortable Evaluate Instrument Based on Fuzzy Comprehensive Evaluate Methods	
<i>Jianli Zhang, Maoyu Zheng, Ying Jiang.....</i>	259
The Impact of Thermal Environment on Hemorheology Chiaractistics of Living Creature	
<i>Lamei Liu, Tianyu Long, Huaqian Xu.....</i>	266
3. Ventilation	
The Needs for an Inter-disciplinary Study on Possible Airborne Transmission of SARS Virus Aerosols in Indoor Environments	
<i>Yuguo Li.....</i>	271
On the History of Ventilation and Health	
<i>Jan Sundell.....</i>	279
Characteristics of Buoyancy Driven Single-Sided Natural Ventilation through Horizontal Openings	
<i>Zhigang Li, Per Heiselberg, Peter V. Nielsen.....</i>	288
A Proposal and Feasibility Study of a New Ventilation Rate Measurement Method between an Optical Path	
<i>Kazukiyo Kumagai, Takashi Kurabuchi, Miyuki Noguchi, Tomoyuki Endo, Takeshi Hirano, Yukio Yanagisawa</i>	295
Evaluation and Analysis of Natural Ventilation in High-Rise Residential Building	
<i>Xiaoyi Wang, Shaohua Wu, Ying Li, Huiming Ke, Aihua Wang, Xingtao Lin, Yuquan Jin, Kejia Cui, Zhihua Zeng.....</i>	296
The Research and Application of Ventilation Way on the Welding Workshop of the Motor Factory	
<i>Qiuxin Liu, Chuanhui Zhou, Xiaoguo Sun.....</i>	302
The Salt-water Experiment and PIV Measurement of Smoke Conveyance in Large Space Buildings	
<i>Xiaoyong Peng, Fei Hu, Hua Li, Weili Gu, Jinbo Deng, Dong Xie.....</i>	307
The Numerical Simulation and Practice of Natural Ventilation and Heat Dispelling of a Hot Workshop	
<i>Shenghua Zou, Ping Li, Dengchun Zhang.....</i>	314
The Application of Natural Ventilation in Ecological Building	
<i>Lan Li, Lin Zhang, Yingde Yin, Dengfeng Gu.....</i>	320
4. CFD Techniques	
Dependence of CFD Predictions of Indoor Air Flow on Initial Conditions	
<i>Lina Yang, Yuguo Li, Guoqiang Zhang, Youming Chen.....</i>	325

Simulation and Analysis of Air Distribution in the Typical SPF Laboratory Animal Room <i>Zehua Liu, Xinbo Jiang, Jun Xiong</i>	333
Investigation of SARS Infection via Droplets of Coughed Saliva <i>Shengwei Zhu, Shinsuke Kato, Jeong-Hoon Yang</i>	341
Airflow and Contaminant Distribution in Hospital Wards with a Displacement Ventilation System <i>Hua Qian, Peter V. Nielsen, Yuguo Li, Carl E. Hyldgaard</i>	355
CFD Simulation of Two Types of Indoor Air Supply <i>Jing Xu, Huan Zhang, Shijun You, Qiaoli Wei, Hui Yang</i>	365
Effects of Heat Source Distributing on Airflow Organization of Displacement Ventilation <i>Guobin Ma, Qingxi Mao, Lei Shan</i>	372
Distribution Sensitivity of Particle Contaminant to Ceiling Exhaust Openings Pattern under Traditional Displacement Ventilation: A Numerical Investigation <i>Ke Chen, Guangcai Gong, Guangfa Tang</i>	378
Test of Salt Liquor Simulating Non-Isothermal Indoor Airflow <i>Yingyun Liu, Hanqing Wang, Jianming Gao, Xianxun Wei</i>	385
Simulation and Analysis of Airflow Model in Sickroom Generated By the Acd <i>Zhen Lu, Jili Zhang, Benqiang Li, Fengfeng Li, Zhonghai Zheng</i>	390
CFD Analysis on Indoor Climate and Air Quality in Operation Theatres <i>B. Yu, P.G. Luscure</i>	397
CFD Simulation and Study on Office Thermal Environment <i>Hui Yang, Huan Zhang, Shijun You, Peiwen Wang, Jing Xu</i>	398
Simulation of the Control Effect to the Indoor Contamination by Different Air-Conditioning Mode <i>Jin Liu</i>	404
5. Project, Equipment & Refrigeration Technology	
A New Approach for Enhancing Supply Air Filtration <i>I. Kulmala, A. Taipale, K. Heinonen, T. Jalonen, V. Mäkipää</i>	408
Research of Air-Conditioning System Configuration after the SARS Calamity <i>Xiaoyan Li, Haitao Li</i>	413
Commitment Analysis on Maximum Ventilation Design Amount in All-around Hotel Buildings <i>Xing Gao, Xiaochen Xu, Xingwen Zhang, Fenglin Yang</i>	417
The Simple Method to Solve the Problem of Ice-filling in the Ice-harvester <i>Liumin Wang</i>	425
The Diagnosis and Analysis for Fan Operation of Dedusting System in Iron-smelting Plant <i>Qiuxin Liu, Zhaoqiu Ding, Yuanyuan Wu, Luxia Huang</i>	431

HVAC Systems' Design in Hospitals Operating Theatres: Comfort, Air Quality, and Energy <i>E. E. Khalil</i>	435
The Temporary Study Status of Air Conditioning Technology by Variable Speed Compressor in Our Country <i>Wentao Tang, Ruixiang Wang, Yujing Hu</i>	436
HVAC System Design of Recreation Center <i>Peibin Wang</i>	442
Reviews on Present and Potential Applications of Thermoelectric Refrigeration <i>Tao Li, Guangfa Tang, Qianghai Luo, Jilong Lu</i>	446
Effect of Failure Scheduling Scheme to Reliability of Complicated Heat-Supply Network <i>Xiaoxia Wang, Mengjun Liu, Pinghua Zou</i>	455
Theoretic Study of Filter Efficiency of Fibrous Filter under Unstable Condition <i>Pengfeng Zhang, Haiming Fu</i>	462
Three-step Liquid Desiccant Air Conditioning System Driven by Gas and Its Characteristic Analysis <i>Jun Xiong, Zehua Liu, Xiangjiang Zhou</i>	466
Research and Development of Health Air-conditioners <i>Guangfa Tang, Yanjie Guo, Di Liu, Jiguang Yan</i>	471
Air Pollution and Purifying Technical Research of the Airtight Environment <i>Li'an Hou, Li Zuo, Yining Wu</i>	476
6. Building Material, Assessment, Energy Saving & Sustainability	
Sustainable Built Environment Education in China and Developing Countries <i>Guoqiang Zhang, Per Heiselberg, Maria Kolokotroni, Narendra Kaushika</i>	484
Household Products and Building Materials are Critical Candidates for Residents' CS and SBS <i>Brigitta Bergund, Anita Gidlof Gunnarsson, Li Zheng</i>	489
Building Energy Options in China <i>Xiao Chen, Guoqiang Zhang, Yu Huang, Likui Yu</i>	490
On the Imprecision of the Water Absorption Coefficient Test on Aerated Autoclaved Concrete <i>Yu Huang, Fariborz Haghighat, M. Bomberg</i>	501
From Energy Saving in Building to Energy Efficiency in Building <i>Yong Ding, Baizhan Li</i>	510
Impact & Promotion of Building Equipment on Modern Architecture <i>Jianlong Liu, Guoqiang Zhang, Chaoyi Tan</i>	513
An Energy Consumption Analysis of Surface Water Heat Pump Systems in Heating Season <i>Tingting Liu, Jianguo Peng, Guoqiang Zhang, Xiao Chen</i>	518

Experiment and Field Study of Energy Storage and Exchange on PCM Wallboard Room <i>Guangyu Cao, Guohui Feng, Xudong Chen, Yanjun Hu</i>	525
Sustainability of Building Cooling, Heating, and Power <i>Xiaoli Hao, Guoqiang Zhang, Youming Chen, Shenghua Zou</i>	531
Development of Web-based HVAC&R Design and Decision-making System <i>Guoqiang Zhang, Yaolin Lin, Chunling Song, Quan Zhang</i>	536
Heating Cost Allocation in China and Study on a Kind of New Allocation Procedure <i>Likui Yu, Guoqiang Zhang</i>	547
Investigating Research on Radioactivity of Building Materials in Tianjin <i>Xuxing Tang, Haiwei Ma, Xinxin Pang, Cheng Liu, Jing Zhang, Jianjun Wang</i>	557
Study of Uncertainties in Evaluation Indicator System for Ecological Residential Community <i>Sheng Jiao, Guangming Zeng, Jianfei Zhou, Xiaoyun Jiang, Lingling Wang, Fu Yang</i>	565
Discussion about Multi-objective Program and Design on Wastewater Reuse in the Ecological District <i>Sheng Jiao, Guangming Zeng, Lingling Wang, Jing He, Fu Yang, Qian Li, Jianfei Zhou</i>	572
Can LEED be Adopted in China? <i>Donglun Allan Yang</i>	579
Discussion on Industrializing of Upholstery Construction <i>Junhong Hu</i>	584
7. Later Paper	
IAQ Standards/Guidelines: Comments and Recommendations for Microenvironments <i>Sirinath S. Jamieson, Roy N. Colville</i>	587
The Application of Light Scattering Dust Sampler in Indoor Respirable Particles PM ₁₀ Measurement <i>Yichuan Zhu, Jing Zhang, Wengang Zhou</i>	595
Author index	596

1. IAQ & Indoor Pollutants

Managing Indoor Air Quality – The Hong Kong Experience

Alfred L. C. Yu, Alain K. L. Lam

Environmental Protection Department, 33/F, Revenue Tower, Wan Chai, HKSAR, E-mail: alainlam@epd.gov.hk

ABSTRACT

Most of Hong Kong citizens spend more than 80% of their time indoors. Recognizing the importance of the indoor environment, the Hong Kong SAR government has implemented an Indoor Air Quality Management Programme in order to increase the public's awareness of the importance of indoor air quality since 2000. A core element of the Programme was a voluntary Indoor Air Quality Certification Scheme for Offices and Public Places launched in 2003. The Scheme specified 12 parameters to cover the physical, chemical and biological aspects of indoor air. It relied on independent professionals to certify whether a participating building or part of it has met the objectives set for these 12 parameters. Successful participants would be awarded with a certificate for display and their names and addresses would be uploaded onto a dedicated web site for public information. The Scheme gave recognition to good management practices and provided incentives for the property owners and management to pursue the best level of indoor air quality, education and publicity about the importance of indoor air quality was another activity area of the Programme. An Indoor Air Quality Information Centre was set up to serve as a focal point to disseminate information, process certification applications as well as providing demonstration of indoor settings that could attain good air quality. In parallel, an Indoor Air Quality Cyber Centre was set up to make use of the internet to provide similar information. Because Hong Kong citizens rely heavily on public transports, a set of professional practice notes for air-conditioned buses and railways was issued to provide guidance on how to ensure better air quality inside these facilities. Source control in the form of emission standard is currently being considered.

Keywords: Indoor air quality; IAQ; IAQ certification; IAQ practice notes for public transport

1. INTRODUCTION

The indoor environment is the environment members of modern society spend most of their lives. We live in houses or high rise apartments; work in office buildings or factories; shop in mall complexes and eat in enclosed restaurants. Many sport games are played indoors and physical exercises are done in air-conditioned gymnasiums. Indoor air quality (IAQ) has direct impacts upon the occupants' health, workplace productivity, staff turnover and industrial relations. Poor IAQ will weaken a society's competitiveness in attracting overseas investors to set up offices there. Therefore, the importance of good indoor environment cannot be overstated.

2. IAQ MANAGEMENT PROGRAMME

Following a study on IAQ completed in 1997, the HKSAR Government has formed an inter

departmental IAQ Management Group to draw expertise from three policy bureaux and ten departments. The Group's main task is to co-ordinate the development of IAQ management programme and control in Hong Kong.

IAQ issues are technically and administratively complex. They touch on areas such as public health, occupational hygiene as well as engineering standards. Because people who can control the IAQ of a building or certain area are often direct beneficiaries of improved IAQ, a self-regulatory approach can be effective. It is the preferred approach in many places including the USA, Singapore, Canada and Europe. Self-regulation is also consistent with Hong Kong's small government principle. To promote good IAQ and to increase the public's awareness of its importance, the Group via the Environmental Protection Department (EPD) started to implement an IAQ Management Programme in June 2000. The Programme includes:

1. a public education and publicity campaign;
2. an IAQ Information Centre;
3. a set of IAQ objectives;
4. a set of guidance notes for IAQ management;
5. an IAQ Certification Scheme;
6. a set of professional practice notes on IAQ for public transport facilities; and
7. study on IAQ legislation.

This paper describes the features of the Programme and its latest development.

2.1 Public Education and Publicity Campaign

To enhance the public's understanding of the pollutants generated in different indoor environment, a public education and publicity campaign was launched. EPD has published a series of information pamphlets and booklets designed to explain the problems and adverse health effects of air pollutants commonly found indoors, and to offer practical advice on how to minimise exposure to them. The information is also available via internet [1].

Moreover, twenty-one IAQ promotion roadshows or exhibitions have been held throughout the territory. These were held in shopping centres of major housing estates, convention and exhibition centre, sports stadium and other sites in easily accessible areas.

2.2 IAQ Information Centre

In January 2001, an IAQ Information Centre was set up to provide information to the public and the professionals on IAQ and its management. The Centre also featured a display of products and technologies that can help improve indoor air quality. In addition, it has three mock-up settings demonstrating how good IAQ could be achieved in home, offices and public places. A Cyber Centre web site www.iaq.gov.hk was set up in parallel to facilitate public access to the IAQ information through the internet.

The patronage of the Centre was encouraging. As of the end of August 2004, over 28 000 people have used the Centre and more than 136 000 people have visited its web site.

2.3 IAQ Objectives

Two levels of IAQ objectives (Excellent Class and Good Class) were set up as benchmarks for evaluating and assessing IAQ. The two objectives were established with the different needs of different buildings in mind. Details of the objectives for 12 parameters were shown in Table 1.

Excellent Class represents very good IAQ that a high-class and comfortable building should have, whereas Good Class represents the IAQ that provides protection to the public at large including the very young and the elderly. These objectives are comparable with international standards and the two Classes provide flexibility to encourage building owners and management to go for the best IAQ according to their needs.

2.4 Guidance Notes on IAQ Management

A booklet titled "Guidance Notes for the Management of Indoor Air Quality in Offices and Public Places" was published in September 2003 to provide comprehensive guidelines for the total management of IAQ. The Guidance Notes specified the procedures, measures and methodologies for evaluating IAQ and achieving the IAQ objectives. The booklet also contains advice to help property management or owners to prevent and manage IAQ problems often found in Hong Kong buildings.

Table 1 IAQ Objectives for Office Buildings and Public Places

Parameter	Unit	8-hour average	
		Excellent Class	Good Class
Room Temperature	°C	20 to < 25.5	< 25.5
Relative Humidity	%	40 to < 70	< 70
Air movement	m/s	< 0.2	< 0.3
Carbon Dioxide (CO ₂)	ppm	< 800	< 1 000
Carbon Monoxide (CO)	µg/m ³	< 2 000	< 10 000
Respirable Suspended Particulates (PM ₁₀)	µg/m ³	< 20	< 180
Nitrogen Dioxide (NO ₂)	µg/m ³	< 40	< 150
Ozone (O ₃)	µg/m ³	< 50	< 120
Formaldehyde (HCHO)	µg/m ³	< 30	< 100
Total Volatile Organic Compounds (TVOC)	µg/m ³	< 200	< 600
Radon (Rn)	Bq/m ³	< 150	< 200
Airborne Bacteria	cfu/m ³	< 500	< 1 000

2.5 IAQ Certification Scheme

A core task of the Programme is an IAQ Certification Scheme. The Scheme was launched in September 2003 to promote good IAQ among offices and public places that are served by mechanical ventilation and air-conditioning systems. It gives recognition to good IAQ management practices and provides incentives for the premises owners and property management companies to pursue the best level of IAQ. Participation in the Scheme is also expected increase the competitiveness of the building in attracting tenants as well as enhancing the corporate image.

The Scheme adopted a voluntary and self-regulatory approach. To participate in the Scheme, the owner or management of the premises must first engage a competent examiner who will carry out a walk-through inspection to check if the premises have any IAQ problems. After the identified problems are rectified, the competent examiner will arrange to measure the 12 parameters in Table 1 at different locations of the premises. If the objectives are met, the competent examiner can certify the concerned premises accordingly and issue a certificate for the IAQ class attained. The certificate will then be sent to the IAQ Information Centre for registration. Having processed the registration, the certificate will be returned to the applicant for display at the premises. The certificate is valid for 12 months. Further measurements in carbon dioxide and respirable suspended particulates will be needed annually to show compliance in order to renew the certification status in the next four years. A full set of 12 parameters will need to be measured again in the sixth year.

A series of leaflets, guidebooks and a compact disc have been published to explain the details of the Scheme. The information can also be downloaded from the web site of the IAQ Cyber Centre [2].

The number of participants has grown steadily since the Scheme was opened for application. Twelve months after the Scheme was launched, 62 premises were certified and registered to have attained Good or Excellent Class IAQ objectives. It shows that the IAQ Objectives in the Scheme are indeed achievable.

EPD has organized six seminar series in the past 12 months to promote the importance of IAQ and to encourage participation in the Scheme. About 2000 persons attended these seminars, including

representatives of property owners and management as well as the relevant professionals. EPD has also taken part in 17 seminars organised by local and overseas professional bodies or other government departments to explain the Scheme to the participants.

Hong Kong's IAQ Certification Scheme is probably the only such scheme in the world. Although the framework of the Scheme is already in place, there is always room for the improvement. EPD is actively seeking views and comments from the stakeholders and will try its best to address them. To further facilitate participation, the Government is considering recognizing holders of a wider range of qualifications as competent examiners. Details of the system are being studied in collaboration with relevant government departments, professional bodies and academics with a view to put the system in place in 2005.

2.6 Professional Practice Notes on IAQ for Public Transport Facilities

Many Hong Kong citizens now live quite some distance from their work place and they spend about an hour or more commuting from their home using public transports such as railway, air-conditioned buses and ferries. There is no existing legislation governing the IAQ of these transport facilities. To provide guidance on how to ensure better air quality inside these facilities, EPD commissioned the Hong Kong Polytechnic University in 2000 [5] to help develop a set of professional practice note for improving the IAQ in the these facilities.

Through many rounds of consultation with the transport operators, professional practice notes for managing air quality in air-conditioned buses and railway facilities were finalized in December 2003 and can be found in EPD's web site [3]. Following the guidelines in the practice notes would improve the air quality in the passenger compartment and enhance passengers' comfort during their journey.

2.7 Study on IAQ Control Legislation

The Hong Kong government is reviewing the need for legislative measures to control IAQ. Controlling indoor air pollution sources such as furniture, construction and renovation materials is another approach that aims to stop or minimize emission sources from being brought indoors in the first place. A study was commissioned early this year to collect information on emission standards for materials that are potential sources of pollution, as well as the market conditions of such products, to help the Government assess the feasibility of related control measures.

3. CONCLUSION

IAQ is a complex subject that, despite its importance, has not been given due attention in the past. The HKSAR Government is taking concrete steps to address the indoor air pollution problems through its IAQ Management Programme. Public education, information dissemination, recognition of efforts and provisions of guidelines are the tasks that are currently undertaken. Source control by setting up emission standards on pollution sources is being studied as a possible way forward to help improve the indoor environment in Hong Kong.

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