

AIVC Celebrates  
Silver Jubilee  
1979—2004

# AIR INFORMATION REVIEW

Vol 25, No. 4, September 2004 A quarterly newsletter from the IEA Air Infiltration and Ventilation



## Message from the AIVC Chairman



As chairman of the steering group of the Air Infiltration and Ventilation Centre, it is my great pleasure to use the Silver Jubilee issue of Air Infiltration Review to provide you with some historical perspective of the Centre.

Other articles will talk about the technical accomplishments of the Centre, but its core mission is to provide a high quality international technical and information forum covering the areas of ventilation and air infiltration in the built environment with respect to efficient energy use, good indoor air quality and thermal comfort. National and international concerns in the areas of energy conservation, sustainable development, responses to climate change impact and healthy buildings have always been at the heart of the Centre.

When the AIVC was first created 25 years ago, I was still a graduate student in physics. In fact, I had to rush completion of my dissertation, which was on Air Infiltration in Buildings, in order to attend the first and smallest AIVC Conference.

Friedrich Nietzsche said "That which does not kill us makes us stronger." While this nihilistic perspective is a poor platform for looking forward, it becomes a tribute to the dedication of the survivors when looking back. The AIVC is very strong indeed, as it has faced many crises through its 25 year history. On the occasion of our Silver Jubilee, I would like to recount a few of these crises.

Perhaps the first significant one occurred when the participating countries felt that the Centre was too expensive. As it turned out this was mostly due to the structure that had a paid Operating Agent that sub-contracted the work out. Since that time, the Operating Agent has directly been conducting the business of the Centre itself; this necessitated the first move of the Centre, but it stayed within England.

Survival of the Centre depends on having enough participating countries and that has often been a problem. The number of participating countries has gone up and down a few times. Some countries have joined and left and then rejoined. Only a few countries (and I am happy to say the US is among them) have been a member for all 25 years. Currently the membership is on the small side, but is growing particularly because of participation from non-traditional countries.

Several years ago, AIVC faced its largest crisis. The economics and politics of many of the member countries made it almost impossible to continue to run the Centre as a traditional jointly-funded annex, because of the direct costs. After extensive review the ExCo and Steering Group made drastic changes to the structure of the Centre and created an unusual organizational structure to position the Centre for future growth - at a vastly reduced contribution level - which is where we stand today.

As we move into the next 25 years, I am proud to be part of this marvelous organization. The mere fact of its survival demonstrates that the AIVC has been providing value to those in the field and also that there is a host of dedicated individuals who have worked hard to keep this happening.

To all the current and past staff, Steering Group members, and conference participants, who have contributed to the success of the AIVC, I offer my personal thanks.

*Max H. Sherman  
AIVC Chairman*

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# AIR

## AIR INFORMATION REVIEW

The newsletter of the AIVC, the Air Infiltration and Ventilation Centre. This newsletter reports on air infiltration and ventilation related aspects of buildings, paying particular attention to energy issues. An important role of the AIVC and of this newsletter and CD is to encourage and increase information exchange among ventilation researchers and practitioners worldwide.

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## Evolution of the technical programme of AIVC over 25 years

*Willem de Gids*  
*TNO Building and Construction Research, The Netherlands*

### Introduction

In 1978 during a workshop of IEA in Paris the big knowledge gap in the energy balance of buildings was the energy penalty due to infiltration and natural ventilation. This was the main reason to propose a new Annex in IEA Energy Conservation in Buildings and Community Systems (ECBCS) programme. There was an international need for cooperation and further research in this field. Annex 5 Air Infiltration Centre was erected. Considering the technical programme over the last years one can see a variety of aspects all related to air transport around and through buildings and the energy penalty caused by infiltration and ventilation. In a later stage indoor air quality (IAQ) and comfort came in the picture so the name of the centre was changed in Air Infiltration and Ventilation Centre (AIVC).

The type of products produced by AIVC over the years are:

- Guides and Handbooks
- Technical Notes (TN)
- Databases
- Literature reviews

The latest development is the production of Ventilation Information Papers (VIP). The publications are widely spread and well known.

### Evolution over 25 years


The first years of the technical programme were completely focused on infiltration and building leakage mainly of dwellings and tools to better measure and predict them. Also the titles of the yearly conferences during that period reflect the focus on air tightness and modelling. The first guides of AIVC were dedicated to airtight design, measurement and prediction of infiltration and ventilation. The Scandinavian countries with their cold climates were at that time far ahead compared with the rest of the world.

The title of the third conference had for the first time the theme Indoor Air Quality in it. Everyone started to realize that at least acceptable IAQ was a prerequisite for convincing people to built tight, even in milder climates.

Some years later the control of natural ventilation became the focus point of international research. Hence also the use of the ventilation provisions was studied and a Technote on that topic was the result. The slogan "Built tight - Ventilate right" is from that period.



*Build tight - Ventilate Right*  
*Illustration from Air Infiltration review*  
*Vol. 1 N° 4 - 1980*

See original page and article on the AIVC-CD 

Slowly the world recognised that not only new buildings should be airtight and well ventilated but that also the improvement of the existing building stock was quite as important. Refurbishment of buildings became the topic of a conference. Later policies and standards on infiltration, ventilation and energy performance were the object of new studies. Another role of AIVC was to guide international research in order to provide a series of Technotes on progress and trends in ventilation research. When reduction of infiltration was no longer the focus of the programme, research started on control of ventilation, including demand control. For several years innovation of components and systems for ventilation became main issues of the program and a Technote was published on the matter. Almost all Technotes (58) has a direct relation with energy consumption due to infiltration and ventilation.

The aspects of air movement or related to comfort and pollution transport, heat recovery and noise were for sometime in the technical programme for a while. Passive cooling and urban aspects are the focus point for the running programme.

In conclusion the technical programme evolves from infiltration and air leakage to control of ventilation optimised against energy and comfort.

### Communication between research communities

Part of the technical programme was to understand each other better. A Technote "Glossary of terms" in different languages was produced:

- English
- German
- French
- Italian
- Dutch

The need of clarification in the field of terms and definitions for ventilation efficiency, ventilation effectiveness, pollutant removal effectiveness etc. resulted in a Technote.

Standards and regulations in terms of policies and strategies is also regularly a subject of studies (see also Standards Database).

Finally, since the beginning, the literature database including literature reviews on the relevant subjects was a big part of the AIVC work.

Nowadays three databases exist:

- Literature (almost 16.000 articles)
- Numerical Data ( 245 MB)
- Standards (264 references)

Especially the numerical database consist in a large amount of technical data for people who predict and design ventilation in buildings.

### Interaction with other air related annexes within ECBCS

The AIVC during the 25 years of its existence has been the portal as well as the stimulus for air related annexes such as:

- Annex 8 Inhabitants behaviour with respect to ventilation
- Annex 9 Minimum ventilation rates
- Annex 14 Condensation
- Annex 18 Demand Controlled Ventilation
- Annex 20 Air flow patterns
- Annex 23 Multi Zone Models (COMIS)
- Annex 26 Ventilation in large enclosures
- Annex 27 Evaluation of Domestic Ventilation Systems
- Annex 35 Hybrid Ventilation in Offices and Schools

Most results of these annexes are covered by a Technote or theme of the yearly conference.

### Future

The latest development is towards demand controlled hybrid ventilation (Annex 35 and EU project Reshyvent). Not only transport energy is minimised but also the delivered flow rate is controlled on demand by several sensor and control strategies.

Integration is the word for future developments. It is no longer possible to think about infiltration or ventilation, neither about a ventilation system and a building as separate items. The interaction between urban environment, site, building and all kind of systems (heating, ventilation, lighting and even plumbing) in relation to the inhabitants with their different attitudes will challenge us to minimise the energy consumption due to ventilation and infiltration and so to find the right solution for a sustainable future.

### AIVC on its way to the future

*Peter Wouters*

*Operating Agent AIVC*

*Belgian Building Research Institute  
Belgium*

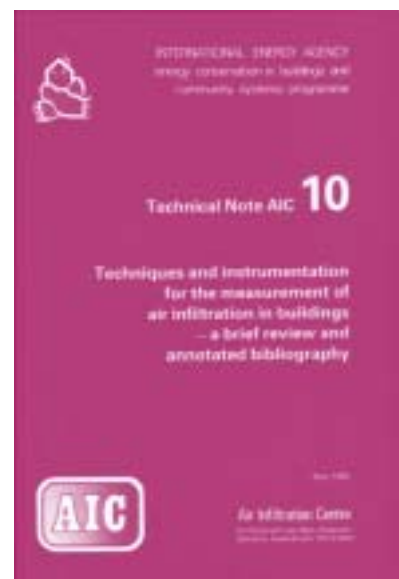
It was in 1983 that, as part of the Belgian national R&D programme on Energy, the decision was taken that Belgium would become a member of the AIC (Air Infiltration Centre, annex 5 of the IEA). To become a participant in this annex was within the Belgian context a good choice. Indeed, one of the priorities in our national programme was to identify possibilities for reducing the energy losses due to infiltration.

The available AIC technical note 10 (1983) 'Techniques and instrumentation for the measurement of air infiltration in buildings' was only of 7 pages (+30 pages bibliography) but was at that time a real state-of-the-art report on how to evaluate air tightness of buildings through testing.

Since then, a lot has changed: The scope of the annex 5, the type of activities, the global environment in which annex 5 is working, the dissemination approach, ... Let me briefly comment on these 4 aspects.

**The scope:** with the AIC, (minimizing) energy use due to air infiltration was the key issue of concern. However, increased evidence of often poor indoor air quality conditions has obliged us to widen the scope and has been reflected in a name change: the Air Infiltration and Ventilation Centre (AIVC). Further changes have occurred in the nineties with e.g. increased awareness of the role of ventilation in terms of summer comfort and avoidance of overheating. Also, more attention is now given to information regarding innovation and technology development of ventilation systems.

**The type of activities:** at the start in 1979, the existing knowledge on air infiltration was very limited and setting up an international centre with a central staff was a very good decision. It allowed to produce in a cost-effective way state-of-the-art reports, databases, literature reviews.... Over time and because of various reasons (a wider scope, more complex issues, an increased number of high quality research groups,...), it became less evident to produce at competitive costs high quality outputs by this relatively small staff. Moreover, collecting the required funds through member states contributions for financing such central staff became more and more difficult. As a result, the decision was taken in 2000 to completely change the operation conditions. Since 2001, the total country contributions for operating the AIVC are 3 times lower than before 2001 and there is now an important commitment by INIVE EEIG and its members.



**The global environment in which the AIVC is working:** In 1980, the role of ventilation in terms of energy use in buildings (heating, cooling, auxiliary energy) was in many countries poorly understood. Moreover, there was little awareness of the role of ventilation in the context of indoor air quality and thermal comfort. In 2004, this is completely different. This is mainly due to the fact that since 1980, hundreds of organizations (research groups at universities and in other research institutes, consulting engineers, professional associations, industry,...) have focused (part of) their work on the interaction between ventilation, indoor climate and energy performance. This very positive development means that one of the major original roles of the annex 5 (producing high quality reports) is no longer an evidence. However, the management of all this knowledge is today a major challenge and it is generally recognized that AIVC can play here a major role: to organize an efficient dissemination regarding ventilation in buildings and this to thousands of users world-wide.

**About this dissemination approach:** In 1980, the decision to produce a paper newsletter and other paper documents did not require a lot of discussions since there were no other means for producing information. It is clearly an understatement to state that some change has occurred since then. As a result of the availability of new tools, it was possible to implement in 2001 a strategy based on the principle 'more information – more users – lower costs'. This strategy was based on increased use of internet (some 7000 visitors per month) and in particular the distribution of nearly all information on the AIVC-CD. A new change is now in preparation and it is planned to make ALL information available on the AIVC website, including the consultation of databases.

To conclude: It is difficult to precisely predict how AIVC will operate within 5 or 10 years and surely not within 25 years. However, it is clear that the AIVC, as many other organizations, will have to continuously evaluate changes in society and technology in order to stay attractive and useful for its target groups. Let's take up the challenge ...

**Ventilation for all, all the time**

*Prof. Eduardo De Oliveira Fernandes  
President of Healthy Buildings 2006*



Ventilation is a twofold 'service' in buildings: a universal role, by assuring the air renovation and bringing 'fresh air' into spaces; and, a more specific one, as an energy carrier either for heating or cooling. The former can be done by natural or by mechanical means or by some kind of hybrid process. It can be seen as a universal duty necessary in every building and every space. The use of air as a thermal energy carrier for heating or cooling has been developed on the basis of the air appropriateness for that purpose. Given the fact that air is always needed, it seemed adequate to use it for both functions. This, however, has been cause for some dysfunctions whenever the subsidiary service – energy for comfort - overwhelms the essential one: ventilation for all, all the time. That is what happens when buildings are made very tight, to reduce heat exchange with outdoors through infiltration, without taking at the same timing and level of decision provisions to assure the appropriate ventilation. And it is also the case when air conditioning systems are taken as if they all were conceived to provide the proper ventilation rate (of 'fresh air'); or, even in the case they do, when they can be switched-off which also implies to stop the ventilation.

The progress in ventilation knowledge through the last century has been extraordinary. And yet, it is a paradox to realize that there are reasons for a growing concern. With the building technologies being approached and diffused in a way far from a holistic perspective, there are reasons to fear that we are going to a period of generalised 'deficit of ventilation' in Europe.

In some regions mechanical ventilation tends to become the standard, associating the energy recovery to the ventilation system in a reverse approach to the mentioned above. In other regions, however, the need for mechanical ventilation can be arguable and, therefore, there is a reason to address the issue from a very early phase of the design process. This may not be a very sophisticated issue but that does not mean less relevance for issues so determinants as health and comfort.

These considerations are particularly relevant when there is nowadays a rush towards air conditioning (present figures of 27% of penetration in EU office buildings and 6% in housing buildings illustrates how wide is the field for the exercise of the commercial aggressiveness in this field) and there should be a need for clarification among the requisites for proper ventilation and the eventual needs for some cooling before thinking air conditioning. That implies also some revision of the concept of comfort, which was somehow responsible for the growth rate of air conditioning in our times and could be more attenuated by a better understanding of a more friendly approach: the adaptive comfort concept.

So, with a better understanding of what comfort means and allows in practice, assuring ventilation for all, all the time, and separating cooling needs from air conditioning solutions a new platform of modern thinking is created to assure the role of ventilation and to create more sustainable buildings towards the future.

## Natural ventilation and design of buildings

Prof. A. De Herde  
PLEA Chairman



Natural ventilation plays an important role in the design and construction of buildings: it contributes to thermic comfort in summer and helps improve air quality. As concerns the former, combined with a shading strategy, natural ventilation makes it possible to eliminate or reduce the use of mechanical cooling systems; when it comes to the latter, depending on the ventilation system selected, it must meet air quality requirements while limiting the building's energy consumption. The natural ventilation strategy will be different for different types of buildings (houses, apartments, schools, offices) with their specific features and its role will vary in importance.

In our field of research and within the framework of annual PLEA (Passive Low Energy Architecture) congresses, natural ventilation has played a central role, initially in the area of bioclimatic architecture and today in that of sustainable architecture.

We must therefore make a clear distinction between ventilation for purposes of hygiene and ventilation for cooling.

Hygienic ventilation removes water vapour, odours, radon and cigarette smoke, and the rate of this ventilation is determined on the basis of the number of people at a particular time and the period of occupation of the building. To be effective and reduce energy consumption, hygienic ventilation systems must be controllable, whether by natural, mechanical or hybrid means.

In the coming years, we can expect the development of controllable "passive" natural ventilation systems, dynamic systems of regulation responding to the rate of occupation and internal climate and dynamic simulation systems for the comparison of various alternatives.

Cooling ventilation is very useful for achieving or improving thermic comfort in summer: air replacement rates are much higher than those necessary for hygienic ventilation and for buildings occupied only during the daytime, and may reach 8 to 10 vol/h at night. Today, in office buildings, a shading strategy combined with a ventilation strategy should be provided and is becoming common. These two strategies naturally go hand in hand with a plan to limit internal additions of heat, thermic inertia accessible to heat and insulation of external walls.

Here again, the development of software relating thermics and air movements must be pursued, with the additional aim of making these programs more user-friendly.

But even more importantly, the integration of ventilation strategies into building design is primarily the responsibility of the architect, in consultation with design offices for the quantification of these strategies.

The AIVC is part of the International Energy Agency (IEA). It is known as Annex V of the Energy Conservation in Buildings and Community Systems (ECBCS) Implementing Agreement. The Steering Group, which serves as its Board of Directors, is formally made up of the participating countries and reports through its Operating Agent (OA) to the ECBCS Executive Committee (ExCo).

Annex V, the AIVC, began as a jointly-funded activity. Participating countries would provide an agreed upon contribution which the Operating Agent would use to run the Centre on behalf of and as overseen by the Steering Group.

Initially, the agreement was to last three years, because it was felt that the problem could be solved in that length of time. The AIVC has since been extended many times, usually in the traditional 3-year increments.

The first Operating Agent was Oscar Fabers of the UK, which is where the Centre was physically located. Now the Centre is operated by a European Economic Interest Group called INIVE, headquartered in Belgium. The Centre itself is almost virtual, with efforts spread out among participating countries.

All technical aspects of the AIVC and control of the copyright and joint fund are still under direct control of the Steering Group, but the operation and dissemination aspects of the Centre are run by INIVE, who raises separate funds through the dissemination of AIVC-generated information. This melding of a high-quality technical information generator with a market-driven dissemination activity positions the Centre for the future.



*The third AIVC Conference  
"Energy efficient domestic ventilation systems for achieving  
acceptable indoor air quality" - 1982 - London, UK*



*Participants of the 4<sup>th</sup> AIVC Conference  
"Air Infiltration Reduction in Existing Buildings"  
1983 - Elm, Switzerland*



*Participants to the 11<sup>th</sup> AIVC Conference  
"Ventilation System Performance" - 1990 - Belgirate, Italy*

# Air Infiltration Review

a quarterly newsletter from the IEA Air Infiltration Centre

The first issue  
of AIR

Vol. 1 No. 1 November 1979

## New Service for the research community

The Air Infiltration Centre (AIC) is a recently established organisation for the technical support of active research in air infiltration in buildings and its effect on energy consumption. The primary role of the AIC is to provide a technical information service to those engaged in research in this important and specialised field. In this first issue of AIR we outline the background, function and structure of the AIC and give some information on the International Energy Agency (IEA), through which the Centre was inaugurated.



Head of the AIC, Peter Jackman

## The Air Infiltration Centre—Its Background

Air infiltration is the uncontrolled leakage of air through cracks and openings in the building envelope. A certain amount of fresh air is required to maintain satisfactory ventilation conditions, but any additional outside air represents an unnecessary energy demand on the building's heating system. Studies have shown that infiltration can account for up to 50% of a building's heating load: since the heating of residential and commercial buildings usually accounts for a large proportion of a country's total energy requirement, reducing infiltration rates can have a very significant impact in the area of national energy conservation.

Many efforts have already been made to reduce the heating loads of buildings by increased insulation standards, double or triple glazing etc. These efforts have resulted in significant reductions in conduction losses, and so the heat losses due to infiltration are becoming relatively more important. Infiltration is a universal problem, but the mechanisms and driving

potentials which control infiltration are not adequately understood. The IEA R & D project on Energy Conservation in Buildings and Community Systems is already active in other areas of energy conservation. The first annex which began in 1976 was a project to compare and evaluate the computer programs of the participating nations which simulate the energy flows within buildings. The aim of the project was to establish internationally accepted state of the art analytical techniques to be used in simulating building energy performance. It was soon apparent that one of the major causes of uncertainty in the simulation process was the estimation of air infiltration. Infiltration depends upon a wide range of variables—climate, building form and leakage. In order to simulate the phenomenon of air infiltration, and to establish defensible building standards, much more information is needed about the controlling parameters, over a wide range of building forms. The Air Infiltration Centre is being set up as a vehicle to assist the international research community in its endeavour to improve the understanding of the controlling mechanisms of infiltration to a level comparable with the other building energy transfer processes.

The AIC is being funded by eight of the member countries of IEA: Canada, Denmark, Italy, Netherlands, Sweden, Switzerland, United Kingdom and United States of America.

## Services

The main functions of the AIC are:

- providing a technical information service
- processing numerical data
- co ordinating research activity

The diagram overleaf illustrates these functions elaborated below.

### Technical information service

Relevant published papers and research reports are being collected, indexed and stored at the Centre. Abstracts of each new article will be compiled and a computer-based data management system will be used to file them and to allow rapid retrieval of material by, for example, subject or author classification. Once the system has been fully established, we will conduct literature searches and provide copies of relevant abstracts on request. Copies of papers or reports selected from the abstracts will then be supplied as specified by the enquirer.



AIR Vol. 1 N° 1 November 1979

First issue of the Air Infiltration Review  
The Air Infiltration Centre (AIC) was at that time located at the Building Services Research and Information Association (BSRIA) at Bracknell, UK. The AIC was directed by Peter Jackman.



AIR Vol. 2 N° 1 November 1980

First AIC conference  
6-8 October 1980  
Theme of the conference:  
"Instrumentation and Measuring Techniques".  
The conference took place at Cumberland Lodge, set in the beautiful landscape of the Great Park at Windsor about 40 km west of London, UK).



AIR Vol. 6 N° 1 November 1984

The AIC is 5 years old.



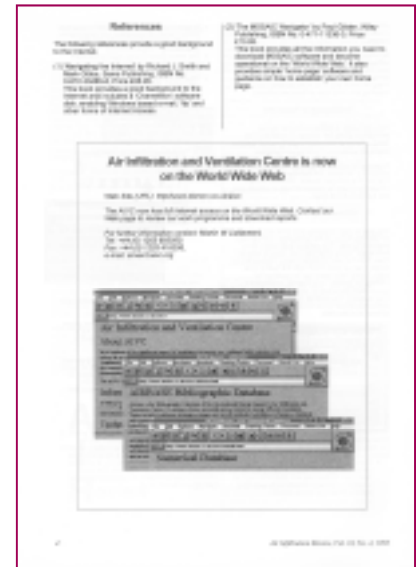
AIR Vol. 13 N° 2 March 1992

Technical notes and the bibliographical database Airbase are highly appreciated products of the AIVC.



AIR Vol. 16 N° 1 December 1994

The AIVC is 15 years old.



AIR Vol. 16 N° 4 September 1995

Air Infiltration and Ventilation Centre is on the World Wide Web

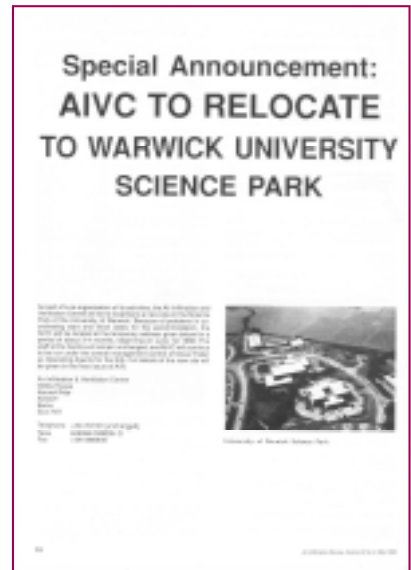




**AIR Vol. 7 N° 4 August 1986**



**AIR Vol. 8 N° 1 November 1986**



**AIR Vol. 9 N° 3 May 1988**

The Air Infiltration Centre (AIC) will in the future be called the Air Infiltration and Ventilation Centre (AIVC). This change of name reflects the Centre's growing role in providing technical support and specialist information on all energy and indoor air quality related aspects of building ventilation. Martin Liddament becomes the Head of the Centre.

The staff of the Centre (left to right): Steve Irving, Emma Young, Peter Charlesworth, Janet Blacknell, Peter Jackman, Jenny Elmer and Martin Liddament.

The AIVC is re-located to a new site on the Science Park of the University of Warwick.



**AIR Vol. 22 N° 2 March 2001**



**AIR Vol. 22 N° 4 September 2001**



**AIR Vol. 25 N° 4 September 2004**

Changes at the AIVC: A new concept. The Operating agent changes from Oscar Faber Group UK Ltd to INIVE eieg. The keywords of the change are "more information – more users – lower cost".

The Air Infiltration Review will in the future be called the Air Information Review. This change is accompanied by a new layout. The readers get to know the AIVC-CD.

The AIVC is 25 years old. The ECBCS Executive Committee took the decision at their Prague meeting in November 2003 to continue IEA Annex 5 – AIVC for a new three year period.

# Air Infiltration Review

a quarterly newsletter from the IEA Air Infiltration Centre

The first  
AIVC Conference

Vol. 2 No. 1 November 1980

Delegates at 1st AIC Conference



1. Chia Shaw
2. Gabriel Huber
3. Carolyn Allen
4. Peter Jackman
5. James Dick
6. Peter Collet
7. Rod Gale
8. Per Olof Nylund
9. Arne Elmroth
10. Johnny Kronvall

11. Sheila Manning
12. Peter Warren
13. Peter Robertson
14. Brian Warren
15. Dick Grot
16. David Harrije
17. Michele Cali
18. Thomas Baumgartner
19. Per Levin
20. Rob Dumont

21. Martin Liddament
22. Willem de Gids
23. Hans Phaff
24. Steve Irving
25. Peter Hartmann
26. Gordon Kennedy
27. Robert Scott
28. Brian Webb
29. Max Sherman
30. David Etheridge

## INFO FROM PROJECTS

### Information from the EC MATHIS Project

Information provided by  
Prof. E. De Oliveira Fernandes

The EC MATHIS project 'Materials for Healthy Indoor Spaces and More Energy Efficient Buildings' was running from February 1998 to January 2001.

The objectives were:

- To enhance and extend the European Data Base on Indoor Air Pollution Sources in Buildings by performing additional research focused on sorption and other aspects of particular interest for dynamic situations, aiming a better link between small-scale chamber testing of single materials and the dynamic situation in real rooms, and by adding emission data for new low-polluting materials.
- To test the developed model for prediction of indoor air quality in real buildings by comparing the measured energy performance and indoor air quality with the results of computer simulations.
- To demonstrate that systematic use of low-polluting materials will lead to increased indoor air quality and lower energy consumption.
- To give input to the current standardisation process regarding the definition of the most appropriate ventilation rates bearing in mind the different sources of contamination and the need for an efficient use of energy.

The main result from the MATHIS project is the SOPHIE database: SOPHIE is a database of indoor pollution sources, including building materials and furnishings, and components of ventilation systems.

SOPHIE is also a tool with which:

- Emission data (chemical and sensory) and toxicological information from indoor air pollution sources, can be retrieved/inserted;
- Comparisons/rankings of pollution sources from the same or different types can be made;

- Predictions of chemical concentrations of certain compounds in a room can be made, with selected sources of pollution, for a given ventilation rate.


SOPHIE can contribute to the selection of low polluting materials and components, resulting in a healthier and more comfortable indoor environment:

- For end users of buildings this means a lower sickness rate, more comfort and higher productivity.
- For manufacturers SOPHIE can be a reference framework to evaluate their own products. For testing institutes it can result in income through R&D on low emission products for the manufacturer or end-user.
- And for (inter)national standardisation bodies SOPHIE could be a reference database based on fundamental criteria (beyond the context of Directive 108/98).

Associated with SOPHIE three main results could be underlined:

- SOPHIE Protocol Testing for building materials, including instructions for chamber operation, sampling and test specimen preparation, and chemical measurements. Instructions for testing structures are now a new part of this protocol. The protocol includes also the description of three different methods for sensory evaluation, proposed by different partners.
- Three new methods and the first results concerning study sorption and diffusion properties of VOCs in the materials. The methods are microbalance, cup and CLIMPAQ methods. The first results of diffusion coefficient from 4 compounds with 8 materials were obtained, with the cup method. The first results of partition coefficient from 2 compounds related to 6 materials were also obtained with microbalance method.
- A new model for IAQ and energy efficiency: it was developed a new model able to evaluate the Indoor Air Quality in a zone of a building taking into account the effect of ventilation strategies, the thermal dynamics of the building and the effect of sorption and desorption of chemical compounds in the building materials.

From the field tests, besides the confirmation of the benefits of using cleaner materials the major results are definitely: the establishment of a correlation between the sensory evaluation in the field and the results of the sensory assessment in test chambers. A factor of 0.45 is necessary to apply to the laboratory results to meet the "in situ" situation.

The publishable final report of this project is available on the AIVC-CD 

## BOOKSHOP

### Indoor Air Pollutants - Part 2: Description of sources and control/mitigation measures


A new Ventilation Information Paper from the AIVC  
AIVC VIP 07, 2004, 8 pp,  
Hal Levin

VIP Indoor Air Pollutants, Part 1 defined major types of indoor air pollutants, their measurement, and concentrations guidelines.



This second part of the VIP addresses the sources of pollutants and effective measures to control them or to mitigate their impacts on occupants and building contents.

The most effective means to control indoor air pollution is through reduction or elimination of pollution sources. Indoor pollutants originate both from within the building and from outside. The first step in controlling the sources of indoor air pollution is to identify them. Building materials, occupants and their activities, and equipment and appliances can all be sources of indoor pollutants. Once the sources have been identified, control strategies can be developed and implemented. Appropriate ventilation strategies can reduce concentrations of pollutants that can not be eliminated by source control. Air cleaning and filtration can reduce the concentrations of contaminants in buildings where ventilation systems recirculate air within the building.

For more information on indoor air pollutants, read the new Ventilation Information Paper 

The proceedings of the  
AIVC conference 2003  
are available on the AIVC-CD

Ventilation, Humidity Control  
and Energy  
Washington, October 2003

67 papers - 390 pages



## MEETINGS AND EVENTS


### Proceedings Future Buildings Forum on Sustainable Building Retrofit

<http://www.ecbcs.org>

The Future Buildings Forum, founded in 1991 under the auspices of the International Energy Agency, tries to identify future challenges that will influence the needs of our building stock. It addresses energy, environmental, economic, and technical issues. To do this, the Future Buildings Forum is organising workshops, dealing with selected topics, which seem to be of great importance. The aim of these workshops is to commonly agree on future oriented topics, which could be addressed in international research and collaboration.

In January 2003, the SUBURET workshop (**S**ustainable **B**uilding **R**etrofit) was held in Sankt Moritz, Switzerland, and the purpose was to promote international activities for advanced retrofit of existing buildings and community systems.

As far as ventilation is concerned, a whole range of topics were raised: management of building airtightness, energy efficient ventilation systems for existing buildings, control strategies, risk management, quality control, ...

The proceedings are now available and the pdf-file can be found on the AIVC-CD 

### Passive and low energy cooling for the built Environment

International Conference  
19 - 21 May 2005 Santorini, Greece  
[palenc2005@heliotopos.net](mailto:palenc2005@heliotopos.net)  
<http://palenc2005.conferences.gr>



#### Scope of the Conference

The scope of this Conference includes all aspects of technology dealing with the summer performance of buildings and in particular ventilation, solar control, thermal mass, thermal comfort, urban microclimate landscaping, low energy architecture, innovative components and materials legislation and regulations, advanced and alternative air conditioners, demand side management, etc. The main aim is to present and discuss the state of the art of research and applications dealing with the summer performance of buildings.

#### Topics

- Passive Cooling Techniques
- Solar Control
- Thermal Mass
- Natural Ventilation
- Hybrid Ventilation
- Heat Protection Techniques
- Advanced Control Systems and Techniques
- Innovative Material and Components
- Ground Cooling
- Evaporative Cooling
- Radiative Cooling
- Microclimate
- Heat Island
- Canyon Effect
- Demand Side Management
- Legislation
- Education
- Climatic Responsive Architecture
- Thermal Comfort
- Indoor Environmental Quality
- High Efficiency Air Conditioners

#### Language

The official language of the conference will be English.

**Important Deadlines**

- Abstract submission deadline: 30 September 2004
  - Notification for paper acceptance: 15 November 2004
  - Final papers due: 31 January 2005
- Please submit your abstract through the Abstract Submission Form that is available at the conference web site.

**Venue-Location**

The conference will be held at the Petros M. Nomikos Conference Center, located in the capital of Santorini island, Thira, overlooking the caldera and the volcano. For more information about Santorini please visit the web site: <http://www.santorini.net>

**Conference Chairman**

Dr. Matheos Santamouris,  
Ass. Professor, Physics Department,  
University of Athens.

**Organizers**

Heliotos Conferences  
Address: 28, Ypsilantou str.,  
GR-17236, Dafni-Athens, Greece  
Phone: +30 210 9730697  
Fax: +30 210 9767208  
Email: [conf@heliotospos.net](mailto:conf@heliotospos.net)  
<http://heliotospos.conferences.gr>

**Co-organizers**

Hellenic Association for the Building and the Environment (Hellenic Representative at REHVA) Techniques".  
The conference took place at Cumberland Lodge, set in the beautiful landscape of the Great Park at Windsor about 40 km west of London, (UK).

**French National Forums on Radon Mitigation**

Bernard Collignan - CSTB  
<http://ddd.cstb.fr/radon>

CSTB is the French scientific representative in ERRICCA 2. In collaboration with the Fédération Française du Bâtiment and French building ministry, CSTB organises a series of three forums related to radon. The first took place at Villeurbanne, near Lyon, on November 2003. The second was at Bruz, near Rennes, on June 2004, and **the third will be at Toulouse the 19<sup>th</sup> of October 2004.**

The main aim of these forums is to inform building actors on radon problem, remediation and prevention into building.

The principles of techniques aiming at decreasing presence of radon in building consist in diluting the radon concentration in inhabited volume and to prevent radon incoming from the ground. In practice, from the various possible configurations for existing buildings, many alternatives techniques calling upon these two combined principles are used.

Among the industrials who attended the forums, some partners from the ventilation world were present. Indeed, ventilation or lack of ventilation plays a key role in radon concentration presence into building. Even if growing up of ventilation rate is not very efficient to diminish indoor radon concentration and if solutions dealing with basement (sealing, ventilation or depressurisation) are more efficient, it is important to have a correct ventilation rate.

In existing buildings, when the diagnosis of the building reveals a lack of ventilation, it is important to realise good ventilation (mechanical or natural) of the latter, without exceeding the lawful levels into force.

The blowing mechanical ventilation system constitutes a particular case. Indeed, it allows, while ventilating the buildings, to fight against the natural depression of the building which is the principal cause of entry of radon in inhabited volume. This principle of ventilation, as well as the unbalanced double flux mechanical ventilation system (mechanical blowing higher than the mechanical extraction) thus constitutes effective means of fight against radon into buildings.

**European Radon Research and Industry Collaboration Concerted Action (ERRICCA 2)**

Chris Scivyer - BRE  
<http://european.radon.ntua.gr>

The European Commission are funding a Concerted Action project looking at radon: *European Radon Research and Industry Collaboration Concerted Action (ERRICCA 2)*. 35 organisations representing 20 countries are working together on the three year project to establish a European scientific led industrial forum aimed at reducing risks to health from radiation (principally radon) in the built environment.

ERRICCA 2 operates on two levels:

- European level – A European Forum, which brings together scientific and industrial representatives from 20 countries - each country providing one scientific and one industrial representative.
- National level – A National Forum in each country to identify radon research and information needs and collaborate on research topics. The National Fora feed ideas and issues into the European Forum and help disseminate output from the European Forum. The National Fora, which meet annually, are aimed at radon scientists, national and local governmental representatives, remediation companies, house builders, building contractors, materials suppliers, equipment manufacturers, measurement companies and representatives from the property buying and selling industry. Fora are linked via the Web creating a network of radon information sources that are freely accessible to anyone working in radon.

ERRICCA 2 is considering:

- How to increase public awareness and confidence
- Building materials - developing common protocols for:
  - measuring radon emanation from building materials
  - testing radon barrier materials
- Protection of new buildings
- Remediation measures for existing buildings
- Common measurement and mapping protocols
- Establishing a European Radon

## AIR + AIVC CD

The Air Information Review (AIR) is a quarterly newsletter containing topical and informative articles on air infiltration and ventilation research and application. The newsletter is distributed with the AIVC-CD.

This set contains the printed version of the Air Information Review and a CD-Rom with :

- Current Air Information Review (with annex documents)
- Related newsletters;
- Airbase (AIVC bibliographical database);
- AIVC publications;
- AIVC conference proceedings.

The set is available through subscription. Subscriptions are for 4 consecutive issues of AIR (from September issue to June issue). See selling prices on the order form.

Enquirers in INIVE countries (Belgium, France, Greece, Norway) can obtain AIR and the AIVC-CD at preferential rates (even free of charge in some countries). Please contact INIVE for practical information ([inive@bbri.be](mailto:inive@bbri.be)).



## AIRBASE

The full version of AIRBASE, the bibliographical database of AIVC, is available on the AIVC CD Rom. It contains more than 15,000 references and abstracts of articles and publications related to energy efficient ventilation.

New additions to AIRBASE include references of numerous papers from the International Journal of Ventilation and from the recent Healthy Buildings conference (National University of Singapore – December 2003).

## Conference proceedings - CD

A CD-Rom with the proceedings of the last AIVC conferences is available. At present, the CD contains the proceedings of AIVC conferences 1998, 1999, 2000, 2001, 2002 and **2003**. See selling prices on the order form.



## AIVC publications – CD

A CD-Rom with all the guides (6), annotated bibliographies (12), ventilation information papers (2) and technical notes (46 – only some old superseded ones are missing) published by the AIVC between 1979 and 2003 is available.

See selling prices on the order form.



## The free publication of the month


One of the AIVC publications is available for free on the Internet (<http://www.aivc.org>). The publication is available for 2 months and afterwards replaced by another one.

## Printed version of old technical notes

Since June 2001, the new publications of the AIVC are no longer produced in a printed version. However remaining printed copies of previous AIVC documents are still for sale at ECBCS Bookshop (£ 15 + postage).

An overview of the remaining stock is available at

<http://www.aivc.org/Publications/clearance.html>

(mainly: Technical notes 39 to 51; Guide to energy efficiency ventilation; Improving ductwork: a time for tighter air distribution systems; Annotated Bibliographies 5 to 10, Conference proceedings 1995 to 2000). A brochure presenting these publications is available on the AIVC-CD .

Send orders by e-mail at [essu@ecbcs.org](mailto:essu@ecbcs.org) (for printed AIVC publications only), or by fax at +44(0)121.262.1994, marked for the attention of Malcolm Orme.

Mailing Address:  
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# AIR

AIR INFORMATION REVIEW  
September 2004



The AIVC CD  
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The AIVC CD

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