

AIR

AIR INFORMATION REVIEW

Vol 26, No. 4, September 2005 A quarterly newsletter from the IEA Air Infiltration and Ventilation Centre



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New AIVC series: Contributed Reports

One of the primary aims of the AIVC is to inform its target group of interesting developments in the field of ventilation, indoor air quality and energy. The AIVC technical notes serve this purpose as well as, more recently, the VIPs (Ventilation Information Papers). However, there are interesting studies which could be published through the AIVC but which don't fully meet the criteria for being published in one of the AIVC's other series such as a technical note, a VIP or an annotated bibliography. In order to make these publications available, a new series has been set up: AIVC Contributed reports. These reports are created by other institutions, but have value to the users of AIVC information and so are reprinted, with permission, as AIVC contributed reports.

On the AIVC-CD, the first 3 contributed reports are included:

CR01: "Aerodynamic noise of fans"
by Alain Guedel (CETIAT) 

CR02: "Flow generated noise in ventilation systems"
by Alain Guedel (CETIAT) 

CR03: "Ventilated double skin façades -
Classification and illustration of façade concepts"
by Xavier Loncour et al. (BBRI) 



Authors believing to have publications susceptible to fit in this series of contributed reports are warmly invited to send them to INIVE EEIG (inive@bbri.be). An internal review will be organised and the author will be informed about the outcome of this review.

AIVC Conference 2006

**Technologies and Sustainable Policies for a Radical Decrease of the Energy
Consumption in Buildings**

November 29th till December 1st 2006 – Lyon – France

More information on page 9

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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Aerodynamic noise of fans

Alain Guedel (CETIAT)

AIVC Contributed Report 01, 2005, 20 pp, Code CR 01

The objective of the report is to present a brief state of the art of the knowledge on fan noise mechanisms, with a qualitative description of the models developed to predict the noise levels associated with these phenomena. The final goal of these researches is orientated towards the design of low-noise fans and the minimisation of acoustic installation effects.

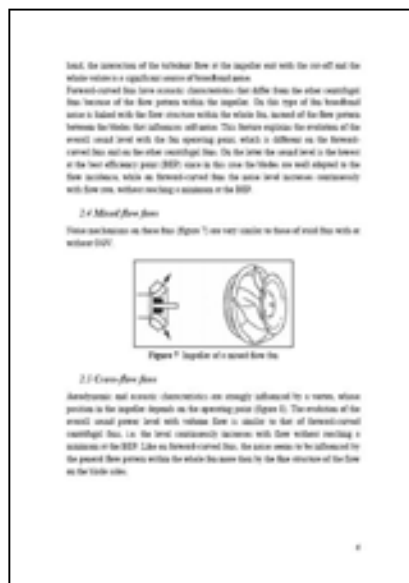
Tonal noise mechanisms are now well known and sound level prediction is more and more precise, even if some difficulties remain to get accurate input data to the models and adequate transfer functions between the incident mean flow field and the blade periodic loading.

Broadband noise, including narrow band noise due to vortex shedding, provides a major contribution to the fan overall A-weighted level, especially at low speed (i.e. below 1500 rpm). That is why it is important to understand and endeavour to reduce the broadband noise level as well.

Despite the considerable work already accomplished in this field, many unknown factors remain in the understanding and modelling of the phenomena at the origin of broadband noise. For instance, tip vortex noise is not fully understood and even less predicted.

Researches on fixed isolated airfoils are much easier to do than on rotating blades, while they may provide valuable information for the development and validation of models that apply to fans, especially to axial and backward-curved centrifugal fans. Forward-curved centrifugal and cross-flow fans are less concerned since their sound characteristics seem to be preferably influenced by the overall flow pattern within the whole fan, rather than by the aerodynamic pressure fluctuations in the blade boundary layers.

The report describes the different aerodynamic noise sources according to the fan type and gives a detailed presentation of the sound mechanisms.



Flow Generated Noise in ventilation systems

Alain Guedel (CETIAT)

AIVC Contributed Report 02, 2005, 18 pp, Code CR 02

When an obstruction is present in a ventilation ductwork, the noise level may be considerably higher than the level measured without the obstruction. This excess noise is due to the interaction of the flow with the element and is called Flow-Generated Noise in the element. Numerous examples may be found in the literature where this mechanism occurs, such as flow noise generated in duct elbows, dampers, grilles, louvers, duct discontinuities.

It reduces the attenuation performance of dissipative silencers and is responsible of the well-known aeolian tones of wires and rods.

The bandwidth of the flow-generated noise spectrum is more or less important according to the type of component and flow characteristics. The maximum level is observed at a frequency f such as the Strouhal number

$$St = \frac{fd}{U}$$

(where d and U are typical obstruction dimension and mean flow velocity) is constant, the constant depending on the component geometry.

Some of these phenomena may generate very narrow bands or even tones, especially when aeroacoustic or vibroacoustic resonances occur.

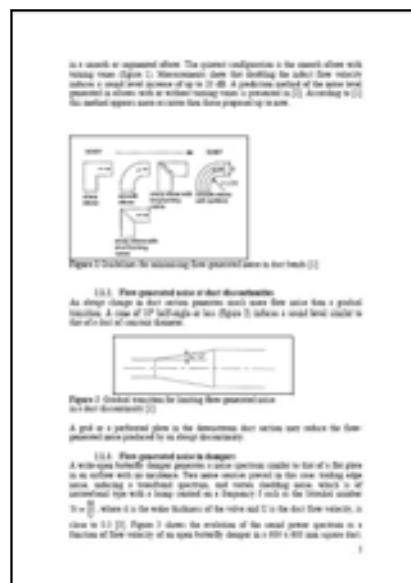
Numerous studies have been carried out for a better understanding and prediction of flow-generated noise in ventilation systems.

Most of this research rests on empirical approach, which allows to make predictions whose limit of validity depends on the model and the considered application. More recent attempts have been made to predict flow-generated noise levels in obstructions such as orifice plates by an entirely numerical approach, but these attempts remain marginal in industrial applications.

The objective of the report is to make a non-exhaustive review of this research, considering that the obstructions are rigid, i.e. they do not radiate noise because of mechanical excitations by the airflow.

Otherwise, a coupling between the flow and the vibrating element should be considered. Such a coupling is not very efficient in air, unlike in water, and may be avoided by stiffening the element.

Duct elements that are dealt with in the report are dampers, grids, orifice plates, elbows, takeoffs, duct discontinuities, more or less streamlined spoilers.



Ventilated double skin façades - Classification and illustration of façade concepts

Xavier Loncour et al. (BBRI)
AIVC Contributed Report 03, 2005, 56 pp, Code CR 03

A ventilated double skin façade, also referred to as "VDF", can be defined as a traditional single façade doubled inside or outside by a second, essentially glazed façade. Each of these two façades is commonly called a skin. A ventilated cavity - having a width which can range from several centimetres at the narrowest to several metres for the widest accessible cavities - is located between these two skins.

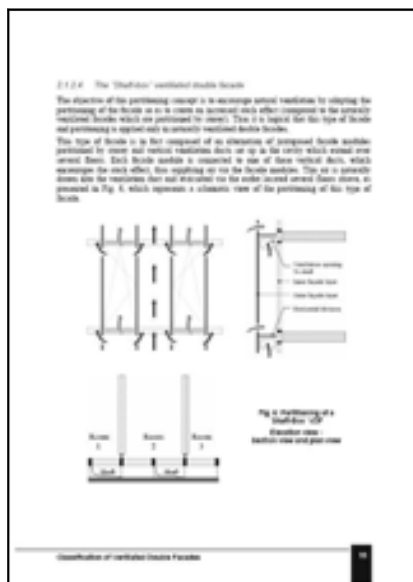
Some façade concepts have a controllable cavity ventilation via fans and/or openings, and other façade concepts, have a non-controllable ventilation. The indoor and outdoor skins are not necessarily airtight. Automated equipment, such as shading devices, motorised openings or fans, are most often integrated into the façade.

The main difference between a ventilated double façade and an airtight multiple glazing, whether or not integrating a shading device in the cavity separating the glazings, lies in the intentional and possibly controlled ventilation of the cavity of the VDF.

The report proposes a classification of the concepts of ventilated double skin façades. The main classification adopted offers a coherent solution to describe unambiguously the various VDF concepts encountered in practice. In order to integrate oneself into the international context, various classifications used in the literature were considered before developing the proposal.

A great deal of work was done in order to clarify the terminology associated with these façades. Numerous versions were discussed before arriving at the proposal, which forms the object of the broadest possible consensus among the many persons to whom it was submitted.

The report neither describes the performances of the façade concepts presented nor considers their technological aspects.



Ventilation, air tightness and indoor air quality in new homes

This new publication from BRE (UK) is a report on a study of ventilation and indoor air quality in 37 homes built in England since 1995. The aim was to assess whether the guidance in the 1995 revision of Building Regulations Approved Document Part F is effective at providing adequate ventilation and good indoor air quality in domestic buildings, and thereby minimising the risks to health and maximising the comfort of the occupants.

Simultaneous measurements of airtightness, ventilation, pollutants, temperature and relative humidity were made in homes during normal occupancy. Diary records of occupant activities and questionnaires on the occupants' perception of the indoor environment were also collected. The pollutants studied were: nitrogen dioxide, carbon monoxide, formaldehyde, volatile organic compounds (VOCs), and particulates.

The work shows that ventilation rates can be below design values and that guidelines for air quality can be exceeded in some homes.

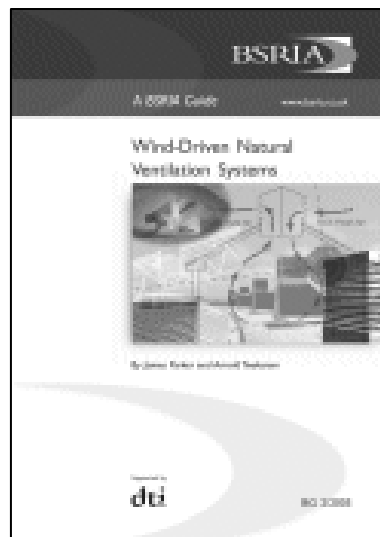
The report will improve understanding of the relationships between air leakage, ventilation and indoor air quality, and will be of interest to local authorities, architects, housing associations, and housebuilders.

BRE Report BR477 (64 pages)
<http://www.brebookshop.com>



Wind-Driven Natural Ventilation Systems

This new publication (February 2005) from BSRIA (Authors: James Parker and Arnold Teekaram) provides guidance on the design and application of wind-driven natural ventilation systems. Topics covered are: how wind-driven ventilation works; key factors for good performance; siting and installation; meteorological data; automatic controls; test method; designing and sizing methodology; worked examples; commissioning; computer modelling. The publication also includes eight case studies demonstrating the use of wind-driven natural ventilation systems.



The International Journal of Ventilation

<http://www.ijvent.org.uk>

Established in 2002, the International Journal of Ventilation is a peer reviewed journal aimed at providing the latest information on research and application.

Topics include:

- New ideas concerned with the development or application of ventilation;
- Validated case studies demonstrating the performance of ventilation strategies;
- Information on needs and solutions for specific building types including: offices, dwellings, schools, hospitals, parking garages, urban buildings and recreational buildings etc;
- Developments in numerical methods;
- Measurements techniques;
- Related issues in which the impact of ventilation plays an important role (e.g. the interaction of ventilation with air quality, health and comfort);
- Energy issues related to ventilation (e.g. low energy systems, ventilation heating and cooling loss);
- Driving forces (weather data, fan performance etc.).

Special editions covering specific topics, collaborative research projects and conferences are also produced.

The International Journal of Ventilation is published quarterly (in print and online).




**VENT DIS.COURSE –
Announcement newsletter**

<http://dea.brunel.ac.uk/ventdiscourse/>
M. Kolokotroni

The announcement newsletter of the VENT DIS.COURSE project has been published recently. It describes the objectives and work-programme of the project.



The VENT DIS.COURSE project is funded by the Intelligent Energy – Europe Programme (Jan2005-Dec2006). The main objective of the project is to accelerate implementation of a core area (ventilation) within the Energy Performance of Buildings Directive (EPBD) at European and national levels and thus improve energy efficiency in buildings by directly transferring existing knowledge to appropriate actors in a suitable format. This will be achieved by developing and promoting vocational training material in a multi-lingual distance-learning format for building professionals to facilitate the implementation of best practice ventilation energy performance (both for indoor environmental quality and thermal comfort) in large new and retrofitted buildings of various types.

The newsletter is available on the AIVC-CD .

**DIAGVENT Guidebook -
Checking the performance
of ventilation systems**

P. Barles (PBC - France),
P.-J. Vialle (CETIAT - France),
M.-Cl. Lemaire (ADEME - France)

Ventilation in buildings is necessary first for hygienic reasons and also to preserve the building structure. This is more essential, today, because the buildings are more and more airtight, mainly due to energy regulations. It is also evident that air renewal energy losses and fan consumption become more and more important in relation with the total energy consumption of buildings.

Nevertheless, many faults are encountered on installed ventilation systems. It seems necessary to check the installations, at the starting up and regularly in time, and not only when the problems occur.

In France, today, there is no obligation for regular inspections of ventilation systems, whereas it is a legal requirement in other countries like Sweden.


DIAGVENT method has been established by PBC and CETIAT, with the support of ADEME, on the basis of many inspections on different residential and commercial buildings, and on the Swedish experience, which were applied in France.



This method is described in a practical guidebook. It includes three levels of inspections or diagnosis:

- DIAGVENT 1: no measurements, only visual checking, for commissioning new installations. The main objective is to verify that the installed system is in accordance with the expected one. The system is started on;
- DIAGVENT 2: is the main part in the method; it is a more detailed inspection, both for new and existing installations; it includes not only visual checks but also performances measurements (total and local air flow rates, pressures, electrical power); it also includes analysis of the results and indications for feasible improvements or more detailed investigations, if necessary;
- DIAGVENT 3: corresponds to specific measurements, when a strong problem has been revealed after DIAGVENT 1 or 2, or after a complaint from the users. It may lead to a very detailed inspection and may include sophisticated measurement techniques (for acoustics, air leakages, air pollution transfers, etc.). Specific measurements are not detailed in the guidebook, but it is shown, depending on the nature of the problem, which point should be checked and what kind of measurement or analysis should be made.

DIAGVENT guidebook should be a practical tool for the professionals: engineering consultants, inspectors, installers, maintenance companies ... It gives, for example, practical information on standard measurement devices for DIAGVENT 2: which type of device and where it can be bought. It gives some useful reference values (air flow rates, duct air leakages, fan electrical consumption...) to help the professionals during the analysis of the results.

The DIAGVENT guidebook is available (in French) on the AIVC CD , with two tables to be used for DIAGVENT 1 and 2.

It can also be free downloaded on CETIAT website: <http://www.cetiat.fr/fr/publicationsveille/servezvous/guidesgratuits/index.cfm>

CLIMA 2007 conference «Wellbeing Indoors»



9th REHVA world conference CLIMA 2007 will have as title 'Wellbeing Indoors' and will be held from 10 till 14 June 2007 in Helsinki, Finland.

For more information:
<http://www.clima2007.org> or
info@clima2007.org

Emissions and Odours from Materials

The 3rd edition of the international conference "Emissions and Odours from Materials" will be held on 12th & 13th October 2005 in Brussels, Belgium

Conference topics

Nowadays, air quality in confined spaces such as vehicles and buildings concerns more and more industries and scientists. Plastic materials, solvents, varnishes, coatings, insulating materials, glues, carpets, textiles... are emitting volatile organic compounds (VOC) that contribute to the ambient air quality in terms of odours and pollutants.

In leptic perception of products and even on their quality. The need of communication between industrials working on this subject is obvious, particularly with respect to discussing research, disseminating information, promoting activities,...


With the participation of leading industry professionals, standards & regulatory experts, R&D scientists, material specialists, industry analysts and market players, the conference offers an ideal platform for fact sharing and acquiring of new knowledge among participants and speakers.

Technical program:

- Standards and regulatory issues: updating legislation and labeling schemes.
- Comfort and impact on health: IAQ, workplace environment, odours and VOCs, off-flavours...
- State of the art for measurement and evaluation: sampling, analysis and sensory evaluation.
- Remediation: optimisation of manufacturing and compounding processes, storage and transport conditions, new barrier properties...
- Recent developments: new requirements, latest trends, new products (low-VOC products, new additives formulations...) in automotive industry, building industry and packaging industry.



For more information:
<http://www.certech.be> or
info@certech.be

The conference flyer is available on the AIVC-CD .

Passive and Low Energy Cooling for the Built Environment

M. Santamouris - University of Athens

New techniques to lower the cooling demands of buildings were presented during the 1st International Conference "Passive and Low Energy Cooling for the Built Environment" (Palenc 2005) that was held on Santorini, Greece, from 19th to 21st May 2005 and was attended by over 250 people from 40 countries.

Around 200 papers were presented by scientists and researchers from all over the world, suggesting new methods for the improvement of the thermal conditions in the urban environment and the decrease of energy consumption due to air conditioning.

The new applications dealing with the summer performance of buildings that were presented at the conference are necessary measures according to the new European Directive on the thermal performance of buildings, especially in Southern European countries.

At the end of the conference, the Chairman of the Scientific Committee, substitute Professor Manthos Santamouris, announced that the next Palenc Conference will be held in Greece in 2007 and then every two years in other Mediterranean countries.

Palenc 2005 was organized by Heliotos Conferences and was under the auspices of the main international organizations in this field.

You can find and order Volume I & II of the Book of Proceedings of Palenc 2005 via the e-shop of

<http://www.conferences.gr> at 40,00 € each.

New European standards on ventilation for buildings

<http://www.cenorm.be>

Two new standards on ventilation for buildings, prepared by the Technical Committee 156, have recently been published by the CEN:

EN 13141-5:2004 - Ventilation for buildings - Performance testing of components/products for residential ventilation - Part 5: Cowls and roof outlet terminal devices

This document specifies methods for measuring the aerodynamic and acoustic characteristics of cowls and roof outlets used in both natural and mechanical ventilation. Only those cowls and roof outlets fitted onto ducts which project above the roof surface are covered by the standard. Regarding the assisted cowls, only the fan assisted cowls are covered by the standard, other types (such as injection assisted cowls) being too recent to be adequately considered for the time being. The performance testing of the "assistance" provided by the auxiliary fan of an assisted cowl is excluded for the scope of the standard.

EN 14518:2005 - Ventilation for buildings - Chilled beams - Testing and rating of passive chilled beams

This European Standard specifies test conditions and methods for the determination of the cooling capacity of chilled beams or other similar systems with free convection, i.e. without forced air flow. Also included is the method to determine local air velocity and temperature below the beam. The purpose of the standard is to give comparable and repeatable product data. The test method applies to all types of convector cooling systems using any medium as energy transport medium. The standard refers to water as the cooling medium throughout, however, wherever water is written, any other cooling medium can also be used in the test. Where air is the transport medium this air may not be discharged into the test room.

Summer comfort control: Casual dress promoted by Japanese government

The Japanese summers can be very hot and humid. As part of an overall plan to save energy by using less air conditioning in non-domestic buildings, the Japanese Prime Minister Junichiro Koizumi has suggested that Japanese businessmen dress casually, rather than in traditional dark business suits, to lessen the effects of Japan's warm weather. An unusually hot summer reportedly contributed to a 3.7% increase in electricity use in 2004. During a speech in March on greenhouse gas emission-reduction targets in the Kyoto Protocol, Koizumi said that his Cabinet ministers "will wear no ties and no jackets" this summer to set an example.

It is clear that such strategy widens the range of acceptable comfort conditions and, as such, creates increased opportunities for passive cooling strategies.

European Commission and energy: information from ManagEnergy

The following initiatives from the European Commission might interest you .:

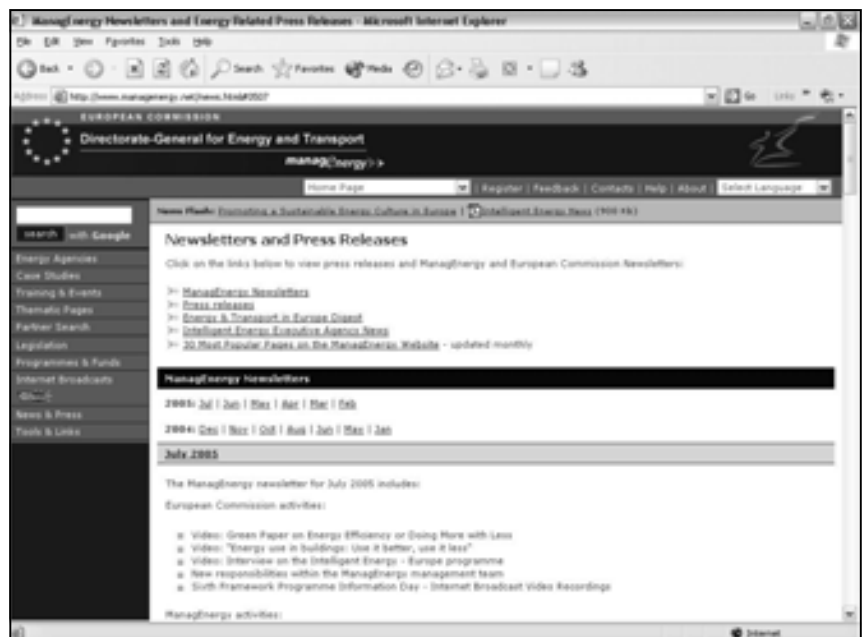
- the Commissioner for energy, Mr Andris Piebalgs, launched the Green Paper on Energy Efficiency;
- the launching of a Public Awareness Campaign on Sustainable Energy is scheduled, for which video recordings can be found on the ManagEnergy website.
- Y the Public Awareness Campaign launch conference is planned on 28-29 November 2005.

The ManagEnergy newsletter for July 2005 can be found at:

<http://www.managenergy.net/news/news.html>

The July 2005 issue includes the following activities of the European Commission :

- video: Green Paper on Energy Efficiency or Doing More with Less
- video: "Energy use in buildings: Use it better, use it less"
- video: Interview on the Intelligent Energy - Europe programme
- new responsibilities within the ManagEnergy management team
- sixth Framework Programme Information Day - Internet Broadcast Video Recordings now available.



First announcement EPIC2006AIVC Conference Lyon, 29 November - 1 December 2006

The 4th EPIC conference and the 27th AIVC conference will be combined and held in Lyon from November 29 till December 1 2006. Moreover, this event will also be an official conference of the IEA programme on energy conservation and community systems.

The title of the conference is **"Technologies and Sustainable Policies for a Radical Decrease of the Energy Consumption in Buildings"**.

Given the oil crisis and the huge increase of the energy consumption (and its environmental impact), the theme of the conference focus on the sustainability principles to be applied in the built environment.

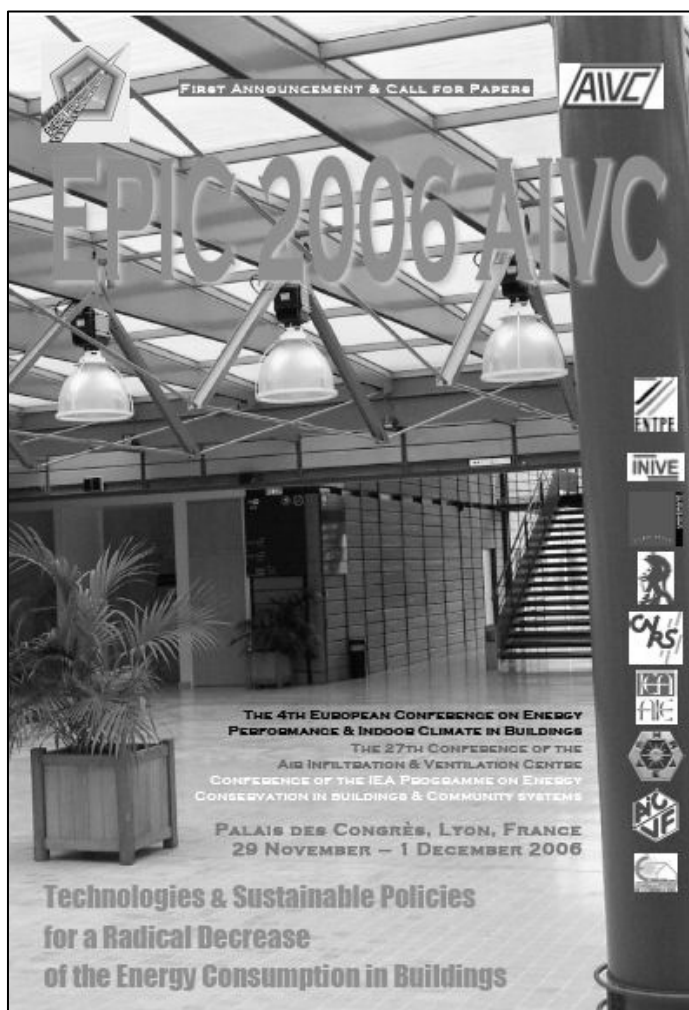
In order to achieve a sustainable development with respect to the energy use and indoor climate in buildings, significant actions are required on the short and long term. The conference will pay attention to both aspects, whereby technological developments, policies, market implementation, education, ... will be discussed. Practical HVAC aspects are covered during the conference but there will be also in parallel and at the same location the CLIMA-MED conference.

Presentations on the following topics will be highly appreciated :

- Extreme low energy buildings and buildings with positive energy
- Energy Performance Regulations and Certification : where are we and where to go?
- The existing building stock : technical, economical and social aspects for a wide scale upgrading
- Performance Assessment of Building Components and Installations
- Sustainable Urban Planning
- Advanced glazing, façade and HVAC technologies
- Natural Ventilation in Urban Settlements
- Design of Buildings of High architectural and Environmental Quality
- Contributions & Challenges of the Information Society in relation to achieving Environmental Quality
- Indoor climate criteria in relation to Sustainable Building
- Indoor Climate, energy & economy, i.e. the economic value of indoor climate, the overall cost of low energy concepts
- Opportunities & Barriers for the integration of Renewables in the Built Environment
- International and National Policies for medium and long term Energy Management – Post-Kyoto
- Innovative concepts for Education and Training

Deadline for the submission of abstracts is December 1 2005.

For more information, see
AIVC-CD,
<http://www.aivc.org> or
<http://epic.entpe.org>



Comfort and Energy Use in Buildings

F. Nicol - University of North London
Getting them Right, Windsor,
April 27-30th 2006



In the wake of the Kyoto Agreement there is an international imperative to reduce energy consumption which contributes to global climate change and pollution. The UK government has set ambitious targets for energy savings and carbon emission reductions from buildings of 20% by 2020. The EU Directive on the Energy Performance of Buildings, valid from January 2006, aims to: *promote the improvement of the energy performance of buildings and ambitious building standards.*

In Britain primary energy consumption by buildings is around 50% of total energy consumption. Almost 50% of this energy is used in the provision of indoor climate control for occupant comfort. Therefore, provision of comfort has a major bearing on energy consumption and carbon dioxide emissions. At the same time energy efficiency without occupant comfort is not sustainable.

The last five years has seen an explosion of interest in thermal comfort in buildings and cities. This interest has taken many forms: comfort surveys, simulations, experimental work, new approaches to cooling and heating and studies of human behaviour in buildings. This interest has led to the formation of the **Network for Comfort and Energy Use in Buildings (NCEUB)** whose aim is to define and promote the research effort needed to understand and enhance the thermal comfort of building occupants whilst also minimising the energy use of buildings. The Network are pleased to be hosting the third Windsor conference on thermal comfort in April 2006

Windsor thermal comfort conferences


The first Windsor conference in 1994 laid the foundation for many of the recent changes in the theory of thermal comfort. In 2001 the second Windsor conference helped to consolidate the renaissance in this area of research influencing international standards and producing proceedings of the highest quality which have become essential reading.

This themed conference will continue this tradition and paper abstracts are invited by 15th October 2005 in the following subject areas:

- Thermal comfort and temperature limits in residential and commercial buildings in different cultures and climates
- Thermal comfort outdoors and in transitional spaces
- Simulation of adaptive processes and the use of controls in naturally ventilated buildings
- Passive and low energy air cooling
- Standards for comfort and energy use in buildings
- Experimental studies of thermal comfort and thermal physiology
- Impacts of climate change and rising fuel costs on thermal comfort and sustainable building design

For more information contact Fergus Nicol - f.nicol@londonmet.ac.uk or visit the website of the Network for Comfort and Energy Use in Buildings -

<http://www.nceub.org.uk>.

The conference flyer is available on the AIVC-CD .

Guide on "Fuel poverty and health"

On average 40,000 more people die in winter (from December to March) in the UK than would be expected from death rates in the rest of the year. Over half of these deaths are from cardiovascular disease and a third from respiratory disease. Influenza, in non-epidemic years, accounts for fewer than 4,000 deaths. This high level of excess winter mortality is not seen in countries with much colder winters than the UK, such as Finland and Russia.

Excess winter mortality is largely preventable if people keep warm both indoors and outside. Keeping warm outside needs a combination of warm clothing and being physically active. Keeping warm indoors needs a combination of adequate heating, insulation and ventilation to ensure comfortable temperatures and humidity levels.

Living in warm, dry, well ventilated homes rather than cold, damp homes can not only reduce mortality, but also reduce illness and promote faster recovery from illness, prevent unnecessary hospital admissions, support timely discharge and maximise independent living. Ensuring warmth at home is therefore an essential part of integrated care.


Action to eliminate cold, damp homes could lessen the winter pressure on the NHS (National Health Service) and help to achieve the national targets for coronary heart disease and to deliver the National Service Framework for older people.

However, for over 4 million households in the UK, keeping the home warm is financially difficult and often impossible. This is because they need to spend more than 10% of their household income on all fuel use including heating their home to an adequate level of warmth. This is known as fuel poverty.

Across the UK, there are now substantial government grants that will reduce fuel bills by improving insulation and heating. They are available for owner-occupiers and those in private rented homes who are receiving certain benefits. These grants are targeted at those most vulnerable to the cold – older people, families with children, disabled people, and those with longterm illness. (Social housing is covered by a government target to ensure that all social housing is brought up to a decent standard by 2010). However, as it is often the case in many areas of health, those people with the greatest need, particularly older people, are also the most difficult to reach.

The Chief Medical Officer for England has asked for all health professionals in contact with vulnerable households to help raise awareness of the grants and to encourage people to apply for help. The benefits for patients and health professionals can be considerable. Data from the National Child Development Study show that the impact of multiple housing deprivations appears to be of the same magnitude as smoking, and greater than that of excess alcohol consumption.

The aim of the *Fuel Poverty and Health Toolkit* is to improve the quality of life, to reduce morbidity and avoidable winter deaths, and to reduce winter strain on the NHS, by encouraging strategic planners and health professionals, in partnership with local authorities, to devise and implement well targeted local strategies to reduce fuel poverty.

The guide is available on the AIVC-CD .



New report from EuroAce “Towards energy efficient buildings in Europe”

EuroAce, the European Alliance of companies for energy efficiency in Buildings, has produced a report entitled ‘Towards energy efficient buildings in Europe’.

The **conclusions** of the report are the following

- While the buildings sector is receiving important attention in the development of overall energy efficiency policies, there is significant potential for cost-effective energy efficiency improvements to warrant the building sector receiving an even higher policy priority.
- There is a good mix of measures between regulations & standards, information, training and financial incentives. The legislative framework provided through the European Union is an important foundation for national efforts.
- The new member states are starting from a difficult position, with fewer human and financial resources than other member states. They also are burdened with the legacy of a large stock of poorly built housing and poor grid-based heat supply.
- There are important networks of experts – both within and outside government – that have evolved in Europe over the past decade or more. These are important in transferring know-how and exchanging experiences.

Recommendations

- There is a need for strong monitoring of the implementation period of the Directive on Energy Performance of Buildings. Once in force in 2006 the Commission needs to take a more pro-active role in ensuring that ms achieve their stated objectives and where there are problems, the Commission needs to take a more active role in finding remedies and where necessary to provide chastisement in order to reinforce Community-wide priorities.
- A network of experts (government and non-government) from the 25 member states should meet at regular intervals to discuss implementation issues related, not only to the Directive on Energy Performance of Buildings, but to the broader approaches to energy efficiency in buildings. The limited terms of reference given to the Energy Demand Management Committee would need to be widened if it is to be the vehicle to carry out this role.
- Directives such as boiler efficiency directive of 1992 need to be evaluated regularly to provide feedback on what progress has been made over the past 12 years and to help policymakers decide whether new initiatives or modifications to existing directives and their implementation are needed.
- Energy certification of buildings has to be seen, not as an end in itself but as a means to an end. Certification needs to be implemented in parallel with effective information campaigns to explain to the wider public (particularly those buying or looking) and should be promoted through real estate agencies and possibly the insurance industry.
- Governments need to find appropriate incentives (not only financial) in order to encourage building owners and users to implement the recommendations provided in the building energy certificates.
- Government-private sector partnerships in promoting energy efficiency in buildings should be promoted and expanded as per Article 12 of the Directive on Energy Performance of Buildings.

- Better end-use analysis needs to be undertaken in order to know what progress is being made on improving the energy efficiency of buildings. The energy certification programme should be designed to help construct and maintain end-use databases to help in the policy analysis.
- There is a need for a long-term commitment from the EC and member states to promote energy efficiency in buildings.
- Governments need to set an example in their own buildings by making sure that they not only meet the minimum requirements under the various buildings-related directives but also implement best-practice measures and set targets that are both achievable and ambitious for their own building stock.
- The new member states need to be closely monitored and supported to ensure that timetables are met and that they have the necessary capacity – human and financial – in order to meet the challenging obligations of membership in the EU. Analysis of remaining potential that was undertaken for the Directive on Energy Performance of Buildings should be expanded to include the 10 new member states.

The report is available on the AIVC-CD  and on the Internet at <http://www.euroace.org>.

Websites by Lawrence Berkeley Laboratories

LBL is managing various websites with information on various ventilation related information:

Indoor Health and Productivity Project - <http://www.ihpcentral.org/>
Online bibliography of more than 900 papers, most with abstracts; summaries of important articles; and more

Residential Ventilation project - <http://epb1.lbl.gov/ventilation>
An overview of research and analysis activities on residential ventilation

Secure Buildings - <http://securebuildings.lbl.gov/>
Advice for Safeguarding Buildings Against Chemical or Biological Attack

Aerosol-Based Duct Sealing Technology -

<http://epb1.lbl.gov/aerosol/index.html>
A new, inexpensive technology to seal ventilation ducts and reduce related energy losses

Ventilation and IAQ for Building Professionals -

<http://eetd.lbl.gov/ied/viaq/viaq.html>
Information on ventilation rates and technologies, filtration, volatile organic compounds, and sick building syndrome, with downloadable papers

The High-Radon Project -

<http://eetd.lbl.gov/IEP/high-radon/hr.html>

Technology transfer of new statistical methodology to identify regions of the U.S. with very high indoor radon concentrations.



AIVC publications online

In its on-going effort to provide value-added services, the AIVC website now includes a protected content feature that provides subscribers with **exclusive online access to AIVC publications and database**.

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- Ventilation Information Papers - 10
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- Urban Air, Indoor Environment and Human Exposure – 23 reports

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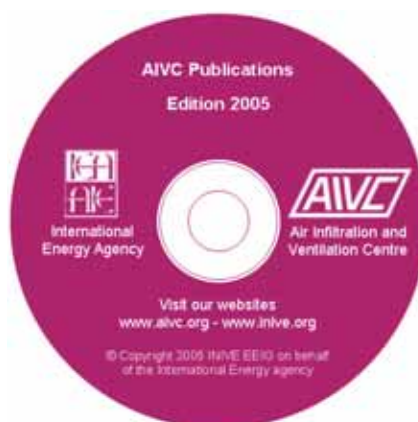
The screenshot shows the AIVC website interface. The header includes the title 'air infiltration and ventilation centre' and the AIVC logo. Navigation links include HOME, ABOUT AIVC, NEWS, FAQ, LINKS, and CONTACT US. A sidebar on the left contains menu items: Bookshop, Publications, Airbase, Conferences, Newsletter, How to subscribe?, External Publications, and Search. The main content area displays a list of publications with columns for title, year, and file size. The 'Technical reports' section is highlighted, with a note: 'Free full publication as a sample (TN 47 - 2.2 MB)'. The list includes:

Year	Title	File Size
2003	VIP 02 Indoor Air Pollutants - Part 1: General description of pollutants, levels and standards	259 kB
2003	VIP 01 Airtightness of ventilation ducts	490 kB
2005	TN 59 Parameters for the design of demand controlled hybrid ventilation systems for residential buildings	3.8 MB
2003	TN 58 Reducing Indoor Residential Exposures to Outdoor Pollutants	563 kB
2002	TN 57 Residential ventilation	897 kB
2002	TN 56 A Review of International Literature Related to Ductwork for Ventilation Systems	548 kB
2001	TN 55 A review of international ventilation, airtightness, thermal insulation and indoor air quality criteria	949 kB
2001	TN 54 Residential passive ventilation systems : Evaluation and design	1 MB
2001	TN 53 Occupant impact on ventilation	1.2 MB
2001	TN 52 Acoustics and ventilation	5.8 MB
1999	TN 51 Applicable Models for Air Infiltration and Ventilation Calculations	3.5 MB
1998	TN 50 Ventilation technology in large non-domestic buildings	4.1 MB
1997	TN 49 Energy impact of ventilation estimates for the service and residential sectors	3.8 MB

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The AIVC holds a conference each year in September/October in one of the AIVC participating countries, presenting around 50 to 100 papers on a variety of topics related to air infiltration or ventilation.

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Airbase

AIRBASE is the Bibliographic Database of the AIVC. It contains abstracts of articles and publications related to energy efficient ventilation. Where possible, sufficient detail is supplied in the bibliographic details for users to trace and order the material via their own libraries.

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- ventilation strategies,
- design and retrofit methods,
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- measurement methods,
- indoor air quality and energy implications

AIRBASE is updated on a regular basis, every three months.

Entries are based on articles and reports published in journals, internal publications and research reports, produced both by university departments and by building research institutions throughout the world.

AIRBASE has grown and evolved over many years (1979 to present day, more than 16000 references).

Airbase is available on the Internet at <http://www.aivc.org>. Search results from Airbase are provided with links to full documents when available online.

Airbase is also available on the AIVC CD with more refined search options (Microsoft Access 2002).



Air Information Review

The Air Information Review (AIR) is a quarterly newsletter containing topical and informative articles on air infiltration and ventilation research and application. Most of the articles in AIR are completed with information or documents on the AIVC website or on a CD-Rom (distributed with the printed version of the newsletter if any). AIR is typically published in March, June, September and December.



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