Newsletter
Air Infiltration and Ventilation Centre

Foreword

We are very pleased to welcome Finland and Poland as new AIVC member countries, raising the number of member countries to 17.

It is positive to see that 170 abstracts have been submitted for presentation at the AIVC conference in Athens 25-26 October 2013 showing the growing relevance of the annual AIVC conference.

Since 2011, topical sessions at the AIVC conferences, structured workshops and webinars have been major milestones for several national and international projects.

Acknowledging these positive developments during the period 2011-2013, the Executive Committee of the International Energy Agency (IEA) Energy in Buildings and Communities (EBC) Programme unanimously approved the continuation of the AIVC for the period 2014-2016.

We hope that this trend over the last few years will continue during the next period.

Peter Wouters, Operating Agent AIVC

no 4
September 2013

Edited March 2013 proceedings

"Securing the quality of ventilation systems in residential buildings: existing approaches in various countries"

In March 2013 an international workshop with 85 participants was organized in Brussels to discuss existing approaches to secure the quality of residential ventilation systems in various countries. In the past large-scale field studies have shown evidence that installation quality of residential ventilation systems is typically insufficient, so it is important to develop frameworks to improve the situation. In total 13 experts presented the status and perspectives in their country, with a major focus on the voluntary and regulatory schemes developed to secure the quality of ventilation systems in residential construction practice.

The results of the workshop will be made available in the form of edited proceedings, which contain an overview of the quality assurance approaches in each of the participating countries: Belgium, Canada, Estonia, Germany, Finland, France, the Netherlands, Norway, Poland, Romania, Sweden, United Kingdom and United States. Each contribution discusses the development of quality labels and performance display for ventilation products, design and installation guidelines, training and qualification schemes for installers, as well as the implementation of commissioning protocols, maintenance protocols, regular inspections and real performance of residential ventilation systems.

Furthermore the results of the workshop will be presented during a topical session at the AIVC conference in Athens in September 2013. During the session a critical review of the pros and cons of existing quality approaches presented at the Brussels workshop will be given. Some examples of solutions to tackle the challenges in ventilation system quality will be discussed more in detail.

In this issue

AIVC Air Infiltration and Ventilation Centre

Feedback on the airtightness workshop, 18-19 April 2013, Washington DC area

AIVC with the support of TightVent and the National Institute of Building Sciences, and in cooperation with NIST, LBNL, BETEC and ASHRAE, organized a workshop on building and ductwork airtightness “Design, Implementation, Control and Durability: Feedback from Practice and Perspectives”. This day and one-half workshop took place on April 18-19, 2013 in the Washington DC area. About 60 participants gathered to exchange views and discuss the latest developments in the area of airtightness, including sealing techniques; durability; test methods and analyses; and challenges and solutions for high-rise buildings. The programme consisted of six topical sessions with contributions from various countries and international organizations.

Regarding airtightness requirements in standards and regulations, several speakers highlighted that requirements for whole building airtightness testing are becoming increasingly common. The example of the State of Washington in the US, which was the first to enforce air barrier requirements with both a maximum material air leakage requirement and a whole building maximum air permeability rate with testing requirements for buildings six stories and higher, was pointed out. Meanwhile, in Poland, the National Fund for Environmental Protection and Water Management (NFEPWM) set up requirements for new low energy buildings that include obligatory testing of building airtightness, which in the case of residential houses are subsidized.

Requirements for enclosure commissioning both for quality assurance and for buildings that are too difficult to test are also being considered in the US. As energy and environmental standards and regulations continue to move towards “green” buildings, building performance requirements become progressively more stringent. Building envelope commissioning has proven to be an effective means of quality assurance that aids in the achievement of these more rigorous performance requirements.

Several speakers addressed the issue of airtightness in large buildings. The need for more careful design and testing and the need for the integration of airtight barriers in the design were pointed out. These change are due in part to the complexities and the specific challenges associated with these types of buildings, such as significant areas of mechanical systems penetrations and taller building heights.

Presentations on leakage at building interfaces highlighted new research and development on airtight wall system configurations with very good performance and new construction products for waterproofing and air-barriers. Innovative sealing techniques and processes to achieve better levels of airtightness were also discussed, including an aerosol-based technology originally developed for sealing ductwork in residences, but whose scope of application has been extended to commercial buildings ducts and envelopes.

Discussions of existing test methods noted that there remains room for improvement in the treatment of measurement uncertainty, particularly for interzonal leakage measurements and the estimation of energy savings.

Another focus area was the energy impact of envelope tightening, where the need was identified for better energy calculations that take into account envelope infiltration and fully capture the energy savings of improved airtightness. A new strategy was presented to more accurately incorporate calculations of infiltration rates into energy modelling of commercial buildings based on relationships between the building infiltration rates calculated using multizone airflow models, building characteristics, weather conditions, and envelope airtightness values. Moreover, ventilation system and infiltration interaction and its implications on energy use was also analysed, with several speakers agreeing on the complexities of this relation. Guidelines for designing mechanical systems to control air pressure and minimize air leakage in mid- and high-rise buildings were introduced.

Concerning durability, the discussions showed that it is still a topic with significant need for research, with the lack of field knowledge could hide significant downstream costs. Nevertheless, new approaches and test methods were presented to assess the service lives of polymeric products and allow for verified predictive models of sealant performance.

Air Infiltration and Ventilation Centre

March 2014 Workshop on "Quality of Methods for Measuring Ventilation and Air Infiltration in Buildings" in Brussels!

There is a trend to perform more ventilation and air infiltration measurements in buildings, either to strengthen commissioning procedures or to learn from field data. This trend is stronger in nearly zero-energy buildings projects or programmes given the significant share of ventilation and infiltration losses on total building energy use.

Although there seems to be a general consensus on the benefits of this approach—e.g., in terms of attention paid to the execution, confidence in actual performance, monitoring of programmes and regulations—there are logically debates about the quality and cost of these measurements.

The objectives of this workshop are to review and to discuss:

- Recent and existing measurement methods for ventilation and air infiltration in buildings;
- Methods to estimate the uncertainty of those measurements;
- Conditions to obtain results whose quality is compatible with the purpose of the measurement;
- Conditions for large-scale implementation and pitfalls to avoid.

The workshop will address primarily field measurement of airflow rates, air exchange rates, air velocities, and pressures. Discussions and presentations may also include laboratory measurements as well as methods for measuring air temperature, air humidity, contaminants, energy use and power related to ventilation and infiltration in buildings. The methods will address natural, hybrid or mechanical ventilation, including ventilative cooling. Speakers will also give background information on readily-available measurement techniques.

Interested parties are invited to submit an abstract by 15 November 2013 to info@aivc.org. Notification of abstract acceptance: 15 December 2013. Deadline for paper submission: 15 February 2013. More information on www.aivc.org.

IEA EBC Annex 62 Ventilative Cooling

The Executive Committee of the International Energy Agency (IEA) Energy in Buildings and Communities (EBC) Programme accepted the formation of a new IEA EBC Annex on Ventilative Cooling at their meeting in November 2012. This new Annex 62 is given a one year preparation phase which, if successful, will continue in a four year working and reporting phase from 2014 – 2017. During the preparation phase two workshops are held to define and focus the Annex's objectives, feasibility, methodology, and deliverables in detail. The 1st Annex 62 Preparation Meeting was held March 21 - 22 in the BBRI offices, Brussels, Belgium and the 2nd Preparation meeting will be held in Athens, September 23-24, 2013.

In order to address the cooling challenges of buildings the research focus of the annex will be on development of design methods and compliance tools related to predicting, evaluating and eliminating the cooling need and the risk of overheating in buildings and to develop new attractive energy efficient ventilative cooling solutions.

Annex 62 will be divided in three subtasks. **Subtask A "Methods and Tools"** will analyse, develop and evaluate suitable design methods and tools for prediction of cooling need, ventilative cooling performance and risk of overheating in buildings. The subtask will also give guidelines for integration of ventilative cooling in energy performance calculation methods and regulation including specification and verification of key performance indicators. **Subtask B "Solutions"** will investigate the cooling performance of existing mechanical, natural and hybrid ventilation systems and technologies and typical comfort control solutions as a starting point for extending the boundaries for their use. Based upon these investigations the subtask will also develop recommendations for new kinds of flexible and reliable ventilative cooling solutions that can create comfort under a wide range of climatic conditions. **Subtask C "Case studies"** will demonstrate the performance of ventilative cooling through analysis and evaluation of well-documented case studies.

EBC Annex 62 will include the participation of approximately 15 countries from Europe, Japan and the US, from universities, research centers and manufacturers and suppliers of ventilation equipment. At the first preparation meeting the focus, research objectives and research methodology was determined. The second and final preparation meeting in September will focus on the development of a detailed work plan for the research to be carried out on Ventilative Cooling from 2014-2017.

Please contact Professor Per Heiselberg (e-mail ph@civil.aau.dk), Aalborg University, Denmark for further information.

BUILDUP overview article on airtightness

AIVC and TightVent prepared an overview article on airtightness entitled as 'Right and Tight: What's New in Ductwork and Building Airtightness?' which has been distributed in March through the BUILD UP News Alert channel. Articles going through this channel are distributed to more than 25.000 e-mail addresses in Europe. The article is now published and available at www.buildup.eu/news/34788

Air Infiltration and Ventilation Centre

Poland and Finland join the AIVC!

The AIVC is very pleased to welcome Poland and Finland as new participating countries! The AIVC at present counts 17 countries composing the AIVC Board demonstrating the growing interest on infiltration and ventilation, probably boosted by the trend towards Nearly Zero-Energy Buildings.

34th AIVC conference (Athens 25-26 September, 2013)

The AIVC holds a conference every year in September/October in one of the AIVC participating countries-members, presenting papers on a variety of topics in the field of air infiltration and/or ventilation. This year AIVC has joined forces with the international platform for ventilative cooling (venticool—www.venticool.eu), recently launched during the 33rd AIVC conference, together with the Building and Ductwork Airitghtness Platform (TightVent Europe — www.tighvent.eu) and the European Cool Roofs Council (ECRC). The conference will be held in Athens, 25-26 September 2013.

Best papers will be considered for full publication in peer reviewed scientific journals.

Visit the conference website www.aivc2013conference.org for more information.

AIVC conference in September 2014 in Poznan, Poland

The 35th AIVC conference will be held in Poland together with the 2nd venticool conference and the 4th TightVent conference. More information will be soon available on our website: www. aivc.org

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Czech Republic: Miroslav Jicha, *Brno University of Technology* • Karele Kabele, *Czech Technical University*

Denmark: Bjarne Olesen, *Technical University of Denmark* • Alireza Afshari, *Danish Building Research Institute, Aalborg University*

Finland: Hannu Koskela, *Finnish Institute of Occupational Health* • Risto Kosonen, *Halton*

France: François Durier, *CETIAT* • Pierre Hérant, *ADEME*

Germany: Hans Erhorn, *Fraunhofer Institute for Building Physics* • Heike Erhorn-Kluttig, *Fraunhofer Institute for Building Physics*

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Operating agent

INIVE EEIG, www.inive.org, info@aivc.org

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