

# PEOPLE FIRST!

## Interview with Bjarne Olesen

Professor Bjarne Olesen is Head of the International Centre for Indoor Environment and Energy (ICIEE) at the Danish Technical University (DTU) in Lyngby, just North of Copenhagen. Bjarne has 45 years of experience working in the HVAC field, both as a researcher and as a practitioner. Besides his employment at the Technical University of Denmark and 1½ year at Virginia tech, he has worked many years in the industry. He worked



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11 years part-time at Brüel&Kjær and 11 years for Velta and for Uponor. Bjarne has published over 400 scientific papers and conference papers. He was president of the international Indoor Air conference that was held in Copenhagen in 2008 and, for more than 35 years, he has been involved in standard writing (e.g. within ASHRAE, DIN, DS, CEN and ISO). Several of the EPBD & EPBD recast standards have been developed under his supervision. From 2011 till 2014 he was member of the REHVA board of directors. This summer – at the ASHRAE summer meeting that is held June 24<sup>th</sup>–28<sup>th</sup> in Long Beach, California – he will be installed as president of ASHRAE.

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### What makes your heart beat faster? What are you really passionate about?



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I think that it is essential that we create a good indoor environment in our buildings, that we built and maintain offices, schools, dwellings etc. and their building service systems in such a way that healthy and comfortable living environments are provided for all. Of course, all in such a way that low energy use is guaranteed too.

For me the people-factor has always been important. As a Master student in the early 70's I had planned to get a summer job as a land surveyor in Greenland, at that time, that paid really well. They did not select me and, then, a certain Professor Fanger asked me to do some summer work instead. He involved me in a lab study with subjects that looked at mental perfor-

mance and thermal comfort. To my own surprise, the relation between environment and technology on the one hand and people, comfort and productivity on the other really triggered me. So, I decided to study with Professor Fanger, to do a Master thesis and after that a PhD thesis. The subject of course had to be people-related: it dealt with local discomfort, floor temperature and radiant floor heating/cooling.

Since then, of course, HVAC technology has developed, but I still think that it is important to put people first, to always look beyond the technology, to work with IEQ requirements that are system independent and to strive at optimizing the energy and health performance of buildings simultaneously.

### What are the most important changes that you saw in more than 4 decades of activity in our field?

Certainly, a lot has changed over the years. It is maybe hard to imagine now but, till the 60's, we kind of only

looked at air temperatures when we designed HVAC systems. Then, we and others from the US came up with the suggestion to systematically include radiant temperature, air speed and humidity, and, at the same time, to look at the combined influence of several parameters such as clothing and metabolism when objectifying thermal comfort.

In the 80's, the focus shifted away from thermal comfort to Indoor Air Quality (IAQ) partly due to a growing number of stories in the media about Sick Buildings. In retrospect, I think that the oil crisis in the 70's and the fact that we started building more airtight buildings without well-functioning ventilation systems caused a lot of IAQ problems. Until the 70's, we all thought that the only thing we had to deal with were people as dominant source of air pollution inside buildings and CO<sub>2</sub> as a tracer for people. At the Denmark Technical University, we were able to show that interior materials and HVAC components could be strong emitters too, e.g. thinking about volatile organic compounds and micro-organisms.

Of course, there is smoking and exposure to second hand tobacco smoke too. In the 80's, in many countries (including Denmark) people were still allowed to smoke in offices, in restaurants, in schools, in airplanes, etc. My colleague Geo Clausen, at the time, showed that if you smoke in a building, any other source becomes more or less irrelevant.

From the beginning of the 90's, we saw a growing interest in field studies and in task performance. We started to look beyond environmental parameters and investigated how suboptimal conditions affect productivity in offices or call centres as well as learning performance in schools. At that time, we also saw the introduction of a couple of innovative climate technologies that work with a separation of the functions of temperature control and fresh air supply. Think of systems such as TABS (Thermal Active Building Systems) and micro-climatisation or personal ventilation systems.

As far as IAQ and materials are concerned, at the end of the 90's, low emission labels for materials were introduced (like the Danish Indoor Climate label).

Since about 15 years ago, also health effects were on the agenda as, for example, the studies of Carl-Gustav Bornehag and Jan Sundell that linked exposure to phthalates in the air (in dust samples) and asthma in young children.

**Since the Paris Agreement on Climate Change, the society seems to be speeding up when it comes to decarbonization of our world, and improving the energy performance of our buildings. Some are afraid that this will have negative side-effects, especially in terms of building occupant health and comfort. What is your opinion about this?**

I recognize that an overfocus on energy performance can lead to health and comfort problems. I know of nZEB projects that had severe overheating problems after they were occupied. Problems that, of course, could have been avoided doing the right kind of calculations or simulations beforehand. Furthermore, the fresh air supply can be an issue, in fact, energy efficient buildings come with very airtight facades, so, when the ventilation system is not well designed or the system has not been correctly installed, it will for sure lead to IAQ problems. That is one other reason why we should pay more attention to the commissioning of HVAC systems.

Nevertheless, I am convinced that the different aspects can be combined. It is just a matter of good design and smart choices. When a new building is designed or an existing building is renovated, the energy performance requirements and, also, thermal comfort, indoor air quality and noise from building service systems should be taken into account. One of the EPBD standards that we have been working on, addresses this: FprEN 16798-1 (formerly known as EN 15251). This standard describes indoor environmental input parameters that can be used for the design and assessment of energy performance of buildings. As a sector, we need to help create nZEB buildings that are not just energy efficient but that are also healthy, comfortable and that meet relevant IEQ requirements.

**The third week of June you will be installed as ASHRAE president. Are there specific aspects that you will focus on during your presidency?**

First of all, I want to make ASHRAE more global and show that we are not only a North-American society. We need to improve our services to our membership outside North-America. This will be done in collaboration and not in competition with other HVAC societies. For example in Europe, REHVA is a very important partner. Even if our memberships are different we have the same goal to provide health and comfort for the occupants in a sustainable way.

Then, I will push for more focus on IEQ and energy use in dwellings. Traditionally, organisations like REHVA and ASHRAE focus on offices, schools, hospitals and other commercial or public buildings. In my eyes, the residential sector will bring a lot of new opportunities in the coming years. Our homes have to be made more energy efficient, and all this in a smart way with adequate attention to the health and comfort needs of occupants. To do this we will have to introduce much more advanced heating, ventilation and cooling technologies in both new and existing dwellings. In that respect, I plan to increase ASHRAE's involvement in the student competition "Solar Decathlon" not only in USA; but around the world.

I would also like to capitalize on the research findings we have now about IEQ and people-effects, especially task performance. Most decision makers are not overly interested in technology per se or IEQ requirements. Nonetheless, most of them certainly are interested in end-user effects like productivity, especially when we can link it to property value assessment and a concrete return on investment.

A third thing that I will focus on is public health in relation to the design and operation of building service systems. Not just in North America and Europe but especially in emerging economies. Certain public health risks can be minimized when building technology is introduced in the right way. Think for example of advanced ventilation systems and ditto filtration systems that are designed to keep the particles out in a building that is located in an area with suboptimal outdoor air quality.

### **You are one of the initiators of the Global Alliance IEQ that is also supported by REHVA. Can you tell a bit more about this?**

Originally, this was ASHRAE's Bill Bahnfleth's idea and I have been involved in this from the start. I am very happy that REHVA has decided to join us, as did AIVC (the Air Infiltration and Ventilation Centre).

The basic idea is to create a platform for organizations that want to stimulate good indoor environments. The goal of the Indoor Environmental Quality Global Alliance (IEQ-GA) is to be the world's primary source for information, guidelines and knowledge on the indoor environmental quality in buildings. Via this new global alliance, we hope to establish better contacts with global organisations like the United Nations and the World Health Organisation.



We do not just focus on thermal aspects and indoor air quality, we are also talking to organisations that are specialized in light and noise. So the idea is to become an IEQ alliance in the broad sense. For more information about the Global alliance, see the alliance's website: <http://ieq-ga.net/>.

### **Any specific message to those that just entered our field? A word of wisdom for young HVAC professionals and young researchers, the leaders of tomorrow?**

Interesting question. I am determined, during my presidency, to convince more young professionals to come join our sector and to help us make a better world.

Recently one of my PhD students walked into my office at DTU and he asked: 'What do I have to do to become like you?'. After laughing about the question for more than a minute, I answered him and gave him 3 tips-for-live.

First, I said, you have to select 1 or 2 areas that you want to become one of the best in. You really have to be specialized. If you try to be good at too many things you will never excel in anything.

The next thing, I said, was: always make sure that whatever you say, as a professional, is evidence-based. Each argument that you use during a discussion or in a paper has to be backup by either your own data, or by research data from others. No room for fake news in our field, sorry!

My third and last tip was: develop a good, international network and put people first now and then. Start with the network built already as a student to get things done in the future. To initiate a change, you need to cooperate with others and you can only do that if, beforehand, you have invested lots of time in meeting the right kind of people, e.g. at international conferences and during ASHRAE or REHVA events. ■