Hiroshi Yoshino ／Professor ／Graduate School of Engineering

Profile

Professor Hiroshi Yoshino was employed as a research associate by the Institute of Industrial Science of the University of Tokyo in 1974 while he was a PhD candidate. Subsequently he received his doctorate in 1976. He joined the Department of Architecture in the Faculty of Engineering of the Tohoku University as Associate Professor in 1978, and was promoted as a full Professor in 1992. In 1997, Professor Yoshino was assigned to the Department of Architecture and Building Science in the Graduate School of Engineering of Tohoku University. He was invited to be a Concurrent Professor of Hunan University (Changsha City, China) and Advisory Professor of Tongji University (Shanghai City, China) in 2002. Professor Yoshino has done a vast number of research studies in the field of building environmental engineering, especially on thermal environment, indoor air quality and energy conservation in residential buildings. He has received various awards in his research field: among these awards are the Award of the Architectural Institute of Japan, the Award of The Society of Heating, Air-Conditioning and Sanitary Engineers of Japan (fives time), The Best Paper Award of the International Journal of Asian Architecture and Building Engineering (twice), and the Fellow Award of The American Society of Heating, Refrigerating and Air-Conditioning Engineers. As for international contributions, Professor Yoshino served as chairman and vice chairman for numerous international conferences. In 2007, he was the Chairman of the 6th International Conference on "Indoor Air Quality, Ventilation & Energy Conservation in Buildings" (200 participants from Japan and 200 participants from overseas). In the same year, the IPCC (Intergovernmental Panel on Climate Change) was awarded the Nobel Peace Prize, in which Professor Yoshino was one of the authors of the IPCC Fourth Assessment Report.

Research Activities

Professor Yoshino specializes in the field of building environmental engineering, particularly on thermal environment, indoor air quality and energy conservation in residential buildings. Recently, the prevention of global warming has become a major issue all over the world. Professor Yoshino has carried out numerous basic and applied research projects in various aspects with the aim of reducing the energy consumption to a maximum extent without compromising comfort and a healthy living environment. The use of natural potentials has become one of the most important concerns. Experimental studies using the test house together with numerical simulations have provided useful data for the design of a passive solar system (shown in photo), a semi-underground house, night-time ventilation to reduce the energy consumption for cooling, and the effect of using exterior thermal insulation etc. Buildings are constructed airtight in order to reduce energy consumption. However, indoor air can be easily polluted because of the lack of natural ventilation. In order to prevent any occurrence of adverse health effects from the house, research projects from multilateral viewpoints as shown in the figure have been put together, with contributions from various experts in the fields of Medicine, Epidemiology and Chemistry. Recently, research related to the prevention of global warming issues has been carried out, for instance: the investigation of future energy consumption trends in Japanese and Chinese residential buildings, and the research and development of desiccant cooling technology using solar energy, etc.

Photo: Experimental house for various research purposes

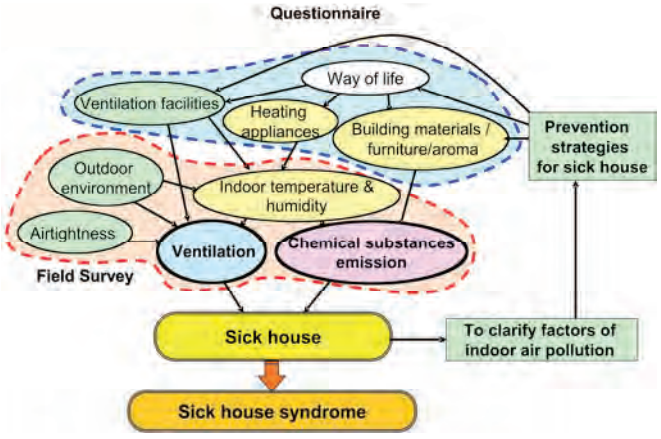

Figure: Sick house syndrome and its influencing factors

Message

Looking back, I took up the position as an associate professor at Tohoku University 30 years ago. I have found great interest in understanding the indoor environment of residential buildings and have been devoting most of my efforts to study within the scope of building environmental engineering since then. I am always keen to acquire new knowledge and I approach my work with enthusiasm. When I come across a problem, I always start from looking into the present conditions of the problem. From my various investigations in the main cities of the Tohoku district, various indoor environment problems have been clarified, for example, air temperatures in the non-heated rooms are very low, the vertical temperature differences in the heated rooms are huge, and so on. How to improve such indoor environments is a wide research topic. It has led to my research on the relationship between the occurrence of stroke and indoor temperature, the possibility of using solar energy in the Tohoku district, the effect of insulation and airtightness, the state of "sick" houses, and the assessment of ventilation performance, etc. Thus, I would say that understanding the root of a problem is the basis of academic research. Besides, continuity is also very important. In order to become an expert, it is necessary to devote at least ten years to one research subject. Another important point is to produce international publications. In my opinion, no matter how fascinating the research is, Japanese written papers cannot be understood outside Japan. Hence, we should publish our papers in the international arena more actively, and focus our research targets on a global scale.