Joining forces in IBPSA, the International Performance Simulation Association

J.L.M. Hensen
Technische Universiteit Eindhoven

Jan Hensen, Prof. Dr.Ir.
Technische Universiteit Eindhoven, The Netherlands
Centre for Building & Systems TNO - TU/e, P.O. Box 513, 5600 MB Eindhoven, The Netherlands, J.Hensen@tue.nl

Jan Hensen is full professor at the Technische Universiteit Eindhoven and at the Czech Technical University in Prague. With a background in building environmental and mechanical engineering, he specializes in development and application of computer modeling and simulation for building performance studies. His focus point is the interaction between building structure, and other energy systems such as: people, heating, ventilation, air-conditioning, lighting, and building integrated power generators (photovoltaics, combined heat and power, etc.). He is the current vice-president of the International Building Performance Simulation Association - IBPSA. In the American Society of Heating, Ventilation and Air-Conditioning Engineers (ASHRAE), he is an international voting member of the Technical Committee on Energy Calculations.

---

[1] Current vice-president of IBPSA World.

Introduction

Simulation-based information has the potential to improve competitiveness, productivity, quality and efficiency in buildings and in the construction industry as well as facilitating future innovation and technological progress.

Simulating energy and airflows in buildings is one of the best-known activities in building performance simulation. However, simulation of light, smoke, moisture, noise and the quality of the indoor environment are often just as important.

The building performance simulation field is rapidly evolving. The techniques and applications of building performance simulation are undergoing rapid change. Dramatic improvements in computing power, algorithms, and physical data make it possible to simulate physical processes at levels of detail and time scales that were not feasible only a few years ago. Applications that were not attainable or practicable some years ago are now commonplace.

Quality assurance, both in the software itself and in the application for real world problems, is essential. The development, evaluation, use in practice, and standardization, of the models and programs is therefore of growing importance. For building design, construction, operation, maintenance and management activities, there is also an urgent need for the integration of "generally applicable" and "generally accepted" methods and tools, for various applications, each having various levels of complexity and/or various types of end-users. Also important is the technology transfer issue within the building simulation field.

IBPSA – the international organization

IBPSA[2] (the International Building Performance Simulation Association) was founded in 1986 as a non-profit society of building performance simulation researchers, developers and practitioners, dedicated to improving the built environment. IBPSA is an international organization with regional affiliate organizations around the world.

To maintain its leading role in the promotion and development of building simulation technology, IBPSA provides a forum for researchers, developers and practitioners to review building model developments, facilitate evaluation, encourage the use of software programs, address standardization, accelerate integration and technology transfer. So that,:
- members all over the Globe find membership in IBPSA worthwhile and profitable in their area of interest;
- governments, industry, utilities and academic institutions look to IBPSA for guidance in determining policies, areas of research, and application development in building simulation;

---

[2] IBPSA details are available at http://www.ibpsa.org

- local chapters around the Globe benefit from the body of knowledge and experience available through IBPSA;
- IBPSA acts as a clearing house for software products and services in building simulation; members network with other members and societies through electronic means;
- IBPSA provides a framework for strategic alliances for information and cooperation in R&D and technology transfer.

IBPSA covers broad areas of building environmental and building services engineering. Typical topics include building physics (including heat, air and moisture flow, electric and day lighting, acoustics, smoke transport); heating, ventilation and air-conditioning systems; energy supply systems (including renewable energy systems, thermal storage systems, district heating and cooling, combined heating and power systems); human factors (including health, productivity, thermal comfort, visual comfort, acoustical comfort, indoor air quality); building services; and advancements and developments in modeling and simulation such as coupling with CAD, product modeling, software interoperability, user interface issues, validation and calibration techniques.

All these topics may be addressed at different levels of resolution (from microscopic to the urban scale), and for different stages in the building life cycle (from early sketch design, via detailed design to construction, commissioning, operation, control and maintenance) of new and existing buildings worldwide.

One of IBPSA's main activities is the organization of a series of bi-annual international conferences: Vancouver, Canada (1989), Nice, France (1991), Adelaide, Australia (1993), Madison, USA (1995), Prague, Czech Republic (1997), Kyoto, Japan (1999) and Rio de Janeiro (2001). The 2003 international IBPSA conference will be in The Netherlands[3].

IBPSA's regionalization program

IBPSA has achieved significant success at the international level - largely through the above mentioned biannual conference program and worldwide electronic mailing facility. IBPSA has also recognized the difficulties surrounding the development of products and services that are appropriate to the day-to-day needs of its members. The underlying causes of these difficulties are twofold. Firstly, the geographical spread of IBPSA members is wide and gives rise to a requirement to cover disparate work practices, technologies and professional needs. Secondly, IBPSA's organizational structure is such that the coordination of activities at the local (regional) level is problematic. At the same time like-minded, but regional, organizations are making significant

---

[3] . Building Simulation 2003 in Eindhoven, see http://www.bs2003.tue.nl

progress at the local level through their seminar, workshop, publications, training and software development activities.

If the construction industry were to be well supported in its attempts to harness effectively the emerging IT and simulation technologies then the establishment of regionally based support organizations was essential. Equally essential was the creation of a structure by which these organizations could affiliate in order to disseminate their know-how and promote their local best practice. Only in this way could the benefits of the new technology be understood and future standardization enabled. It was with the view of a network of autonomous regional organizations that IBPSA has turned to regionalization and is encouraging existing or newly formed groups to become IBPSA affiliates.

IBPSA – NVL as an example regional affiliate

Interested parties and stakeholders in building performance simulation in the Dutch speaking part of European region have formed the regional association IBPSA – NVL (Nederland + Vlaanderen). The main objective of IBPSA-NVL is to increase the interest and the level of acceptance of building performance simulation by the following activities.

- Promotion of correct and efficient application of building performance simulation.
- Transfer of knowledge regarding building performance simulation to the building construction industry.
- Increasing the knowledge and skills within the building performance simulation field.

IBPSA-NVL wants to contribute to the improvement of the design and the design process by stimulating adequate application of building performance simulation and by giving direction to further developments of this technology. Of course this will be done in interaction with all parties involved in the building design and construction process.

In practice this would mean, for example, that energy and comfort standards can be achieved easier and with a better result. It will be easier to identify and size "optimal" concepts for buildings and systems. Simulation tools need to be adapted to the design practice. The consequences of design alternatives will be recognized sooner. This will allow a faster design process at lower costs.

IBPSA NVL aims to achieve this through knowledge transfer and communication with all parties concerned (policy makers, real estate developers, architects, consulting engineers, developers, researchers, teachers, etc). This is necessary to remedy the lack of knowledge by some parties in the building process. It also creates a base and gives

direction for further development and application of building performance simulation. For this purpose IBPSA-NVL maintains a website[4], runs an email-discussion list and arranges special editions in various trade journals. IBPSA-NVL also organizes symposiums, workshops, excursions and theme gatherings.

IBPSA-NVL has private members and is supported by sponsor organizations. Private members of associated organizations are allowed to become a member of IBPSA-NVL without having to pay a fee. By joining with IBPSA-NVL, the other organizations strongly increase for their membership the possibilities for inter(national) networking and knowledge transfer regarding building performance simulation. As implied by Figure 1, it is a very effective way for IBPSA-NVL to increase the membership.

IBPSA-NVL has an autonomous board of directors. Currently there are five working groups, which focus on the following themes:

- Knowledge transfer to users, students (education, training etc.); e.g. in terms of how the technology needs to be used, practical applications and theoretical background.
- Information exchange between researchers and developers, in particular to give, where possible, direction to efficient software development by mutual adjustment of projects, approaches and activities.
- Positive confrontation between research and practice, which focuses on user requirements and expectations, and how these are met by software currently available or under development.
- Quality control, which looks at the requirements, which need to be met by software and users.
- Public relations, including all communications mechanisms such as the website, the newsletters, the email-discussion list and the annual conferences.
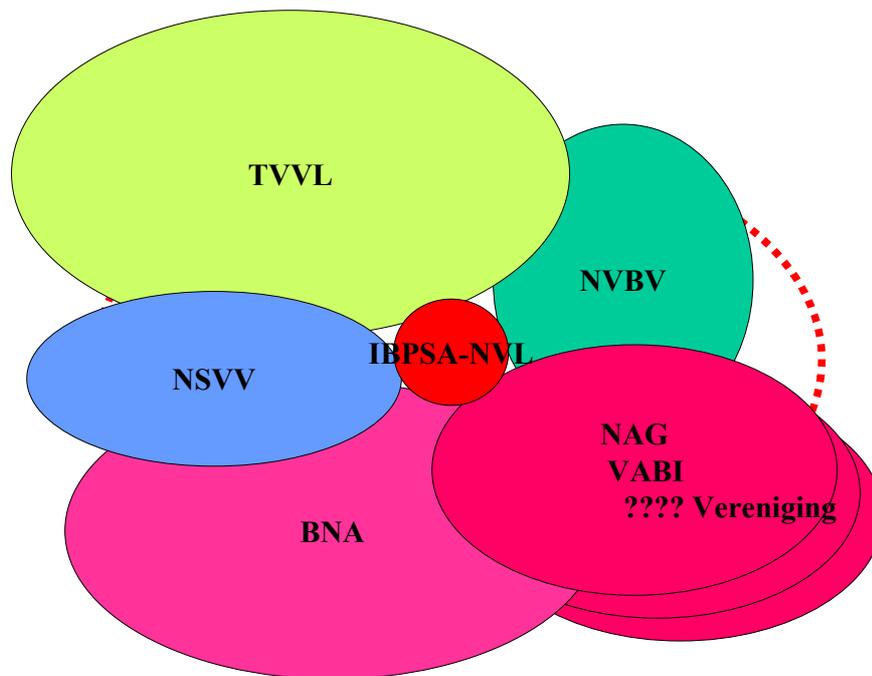
---

[4] http://www.ibpsa-nvl.org

Figure 1   IBPSA-NVL and how it co-operates with associated organizations such as TVVL (Netherlands Association for Technical Systems in Buildings), NVBV (Netherlands - Flemisch Building Physics Society), BNA (Association of Dutch Architects), NSVV (Netherlands Foundation for Lighting), NAG (Netherlands Acoustical Society), VABI (Association for Computerization in Buildings and Building Services) etc.

IBPSA-NVL is financed with profits from the activities mentioned above and by financial contributions from the sponsor organizations. Sponsor organizations have no influence on the organization, the management, procedures or other activities of IBPSA-NVL other than via the input of private members.

Conclusions & future work

Building performance simulation has the potential to deliver, direct or indirect, substantial benefits to all building stakeholders and to the environment.

It is the mission of IBPSA and its regional organizations to promote correct application and further development of building performance simulation.

The time seems right to establish an IBPSA affiliate organization in the German-speaking region of Europe.