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OVERVIEW OF IBPSA'S LONG-TERM GOALS AND CURRENT APPROACHES; INTERNATIONAL AND REGIONAL

J. L. M. Hensen[1]

Technische Universiteit Eindhoven
Center for Building & Systems TNO-TU/e
P.O. Box 513, 5600 MB Eindhoven, The Netherlands
www.bwk.tue.nl/fago/hensen
[1]current Vice-president of IBPSA World, www.ibpsa.org

ANOTACE: International Building Performance Simulation Association (IBPSA, volně přeloženo Mezinárodní asociace pro simulaci budov) existuje proto, aby podporovala rozvíjela vědní obor, jehož cílem je zlepšovat projektování, výstavbu, provoz a údržbu nových i existujících budov na celém světě. Příspěvek uvádí řadu mezinárodních aktivit, jejichž prostřednictvím IBPSA naplňuje své poslání, jako jsou konference, vydávání zpravodaje a dalších publikací. Dále se zabývá rostoucím významem činnosti na regionální úrovni.

ABSTRACT: The International Building Performance Simulation Association (IBPSA) exists to advance and promote the science of building performance simulation in order to improve the design, construction, operation and maintenance of new and existing buildings worldwide. As elaborated in this paper, IBPSA achieves this by a number of international activities such as conferences, newsletter and other publications, as well as increasingly by activities at the regional level.

BUILDING PERFORMANCE SIMULATION

The use of computer-based models for performance predictions has become almost ubiquitous in the design, operation and management of buildings and the systems that service them.

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.

The building industry, without a doubt, is one of the most important industrial and economical sectors influencing the quality of life and the environment. And yet, planners and property developers pay very little attention during the design process to the life-cycle cost of owning and operating buildings.

Building performance simulation offers the potential to cope adequately with building performance related concerns, as well as with the construction process. Increasingly, computer based models (programs) are being employed to aid in the design, operation, or management decision making process.

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 (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. IBPSA details are available at http://www.ibpsa.org .

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;
- 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 modelling and simulation such as coupling with CAD, product modelling, 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.

IBPSA'S INTERNATIONAL CONFERENCES

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), and Kyoto, Japan (1999).

The 7th International IBPSA Conference in Rio de Janeiro, 13 - 15 August 2001, was again a big success both in terms of content and location (next to Copacabana beach!). The organizers did their utmost to maintain the standard of the Building Simulation conferences as the premier event in the field and the climate, surroundings and atmosphere made it an unforgettable Brazilian experience for all who participated in the conference and social program. 172 papers were presented; there were also 18 "non-commercial" software demonstrations. There were 3 keynote presentations: Building Simulation in Brazil by Nathan Mendes, Roberto Lamberts and Jos. A. Bellini da Cunha Neto, Building Simulation Trends going into the new Millennium by Godfried Augenbroe, and Issues on the Integration of CFD to Building Simulation Tools by Clovis R. Maliska. Some Rio '01 statistics, in comparison to Prague '97 and Kyoto '99:

	Prague	Kyoto	Rio
Abstracts submitted	215	286	288
Abstracts accepted	204	285	279
Manuscripts submitted	134	194	186
Papers presented	120	183	175

Building Simulation 2003, the 8th biennial IBPSA international conference looks like maintaining its place as the premier international event in field of building performance simulation. Organized jointly by IBPSA Netherlands + Flanders, Technische Universiteit Eindhoven (TU/e) and the Center for Building and Systems TNO – TU/e, and supported by a distinguished list of sponsors including ASHRAE and REHVA, it will take place in a vibrant modern city in the centre of Europe. IBPSA's international conferences have gone from strength to strength and this promises to be the best yet, with a new, three-and-a-half day format and an exiting range of topics to address. The conference will begin with a half-day session, which includes keynote speeches by a world-renowned architect and a world-famed engineer introducing the main conference theme "Simulation for better building design". The exhibition will be opened at the same day.

The next three days will see presentations of many high quality papers, software demonstrations, and plenary sessions to discuss

IBPSA and the conference theme. The conference will include several social events, an accompanying person program and post-conference tours. For further information and pre-registration see www.bs2003.tue.nl .

Full-text copies of papers presented at previous IBPSA international conferences are available from www.ibpsa.org .

IBPSA EDITED SPECIAL ISSUES

Starting with Building Simulation '99 in Kyoto, a selection of authors was invited to expand their conference papers for inclusion in special issues of high-quality archival journals. This resulted in special issues of Energy and Buildings and Building and Environment in 2001 ('99 conference papers) and 2002 ('01 conference papers). For Building Simulation '03 we anticipate three special issues in 2004, the two journals mentioned above and Building Services Research and Technology.

IBPSA'S REGIONALIZATION PROGRAMME

IBPSA has achieved significant success at the international level - largely through the above mentioned biennial conference program, special issues of archival journals 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 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. The current list of IBPSA regional affiliates includes Australasia, Brazil, Canada, Czech Republic, France, Ireland, Japan, Netherlands + Flanders, Scotland, Slovakia, USA. In several other countries a regional organization is being established.

The following section is merely an example of how a regional organization could be organized and what kind of activities it could carry out.

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 could 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 http://www.ibpsa-nvl.org, 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.

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.

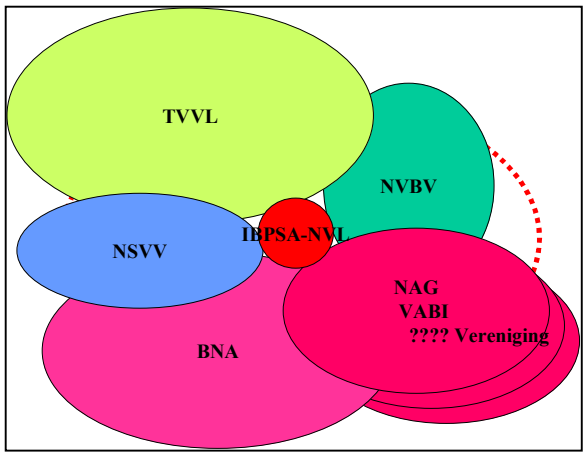

Figure 1 *IBPSA-NVL and how it co-operates with associated organizations such as TVVL (Netherlands Association for Installations in Buildings), NVBV (Netherlands - Flemisch Building Physics Society), BNA (Association of Dutch Architects), NSVV (Netherlands Foundation for Lighting Science), NAG (Netherlands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

CONCLUSIONS & FUTURE WORK

Building performance simulation is currently the only engineering technology enabling an integrated approach of human factors, building physics, building services and building energy supply systems.

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.