Factsheet

Occupant-centric
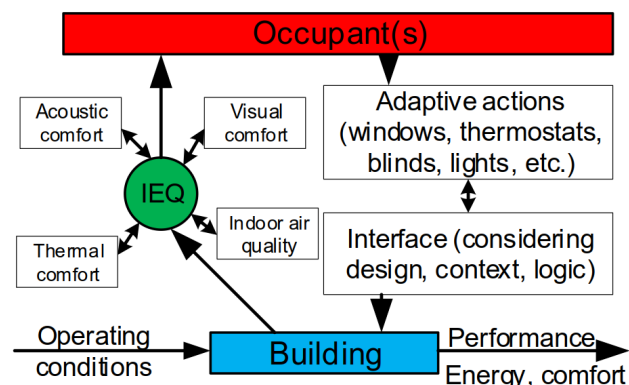# Building Design and Operation

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EBC ANNEX 79

Previous research (for example resulting from EBC Annex 53) has identified the strong influence of occupants on building performance. Recently, EBC Annex 66 has provided a sound framework for experimentally studying and modelling different behavioural actions, including the implementation of these models into simulation platforms. But, real operation of buildings shows that many such models do not represent the manifold human interactions with a building appropriately enough, and that there is no guidance for designers and building managers on how to apply occupant behaviour models in everyday practice.

This project provided new insights into comfort-related occupant behaviour in buildings and its impact on building energy performance. An open collaboration platform for data and software was created to support the use of 'big data' methods and advanced occupant behaviour models. It further promoted the application of this knowledge in building design and operation processes by assisting

PROJECT OBJECTIVES

1 developing new scientific knowledge about adaptive occupant actions driven by multiple interdependent indoor environmental parameters

2 understanding interactions between occupants and building systems

3 deploying 'big data' (e.g. data mining and machine learning) for the building sector based on various sources of building and occupant data as well as sensing technologies

4 developing methods and guidelines and preparing standards for integrating occupant models in building design and operation

5 creating focused case studies to test the new methods and models in different design and operation phases

decision making and by supporting practitioners.

ACHIEVEMENTS

The following deliverables has been achieved:

– Enhanced scientific knowledge about comfort-driven occupant interactions with building technologies. This includes methodological approaches to examine multi-stressor effects by environmental influences on human subjects.

– Informed insight into the potential of various data sources and sensing technologies, as well as applications of data-based methods for knowledge discovery and modelling of occupant behaviour.

Advanced modelling of occupant behaviour in buildings assumes that occupants are active decision-making agents who respond to indoor environmental conditions.
Source: EBC Annex 79

INTERNATIONAL ENERGY AGENCY

The International Energy Agency (IEA) was established as an autonomous body within the Organisation for Economic Co-operation and Development (OECD) in 1974, with the purpose of strengthening co-operation in the vital area of energy policy. As one element of this programme, member countries take part in various energy research, development and demonstration activities. The Energy in Buildings and Communities Programme has co-ordinated various research projects associated with energy prediction, monitoring and energy efficiency measures in both new and existing buildings. The results have provided much valuable information about the state of the art of building analysis and have led to further IEA co-ordinated research.

EBC VISION

By 2030, near-zero primary energy use and carbon dioxide emissions solutions have been adopted in new buildings and communities, and a wide range of reliable technical solutions have been made available for the existing building stock.

EBC MISSION

To accelerate the transformation of the built environment towards more energy efficient and sustainable buildings and communities, by the development and dissemination of knowledge and technologies through international collaborative research and innovation.

– An open collaboration platform for data and software for supporting the use of data-mining methods and tools for applications within the area of occupant behaviour.

– A repository of advanced occupant behaviour models for digital planning environments.

– Proposals for standards and policy support for implementing occupant behaviour simulation in building design and operation practice. This also includes the integration of the models in modern digital planning (BIM) environments.

– Guidelines on how to apply occupant models and occupant behaviour issues within building technologies, including user interfaces, as part of everyday design and planning processes.

Project duration
Completed (2018 - 2024)

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Further information
www.iea-ebc.org