EXPLORING DESIGN SUPPORT POSSIBILITIES OF BUILDING PERFORMANCE SIMULATION TOOLS IN BUILDING DESIGN PROCESS

Gülsu Ulukavak Harputlugil¹, Merve Bedir²
g.u.harputlugil@gmail.com¹, m.bedir@tudelft.nl²
Faculty of Safranbolu F. T. Fine Arts & Design- University of Karabük, Turkey¹,
OTB Research Institute for Housing, Urban & Mobility Studies-TU Delft, the Netherlands²

ABSTRACT

Simulation is claimed to be an effective tool in the building design process. It is purported to degrade complex systems integration matter to the comprehension of designers using either a tool or process related approach. In this study, the pre-design phase is considered with a focus on the energy performance of buildings. The aim is to explore the level of design support provided by building performance simulation tools through an analysis of a selection of commercially available programmes. The tools are selected following a consideration of their development goals, and are evaluated according to the data they require in the early design phase, and the design data they provide in return. A future study will include a real-time observation of the building project design process to find out how specific parameters are determined during concept development and also the weighting factors of the respective parameters. To this end, a total design survey will be executed among a group of architects that will help explore how a designer chooses the most appropriate tool based on their conceptual approach.

Keywords: Building design, building performance, design support, simulation tools

THEORETICAL BACKGROUND

The building design process has become more complicated with the introduction of new technologies for building elements, creating the need for the involvement of a greater number of consultants in the design process. For this reason, a number of simulation programmes have been introduced to guide the designer throughout the process, these are based on two different approaches: tool box metaphor and computer supported design environment [Clarke, 2001]. In the former, the designer carries out a performance evaluation of a specific building component with the help of the simulation programme. This data is then translated to the related design parameter. The second approach is based on computer assistance, by which design decisions are evaluated through the simulation programme and the performance data is directly fed into the design process (Figure 1). For the evaluation of energy performance, either tool box or computer-supported design approach is used by engineers to make the necessary calculations for the building to be designed by the architect. Later it is revealed that simulation tools should be more designer (architect) oriented due to the fact that energy performance of a building is more related with the early design stages.