

Evaluation of Easy-to-Use Energy Building Design Tools for Solar Access Analysis in Urban Contexts: Comparison of Friendly Simulation Design Tools for Architectural Practice in the Early Design Stage

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Abstract : Current building sector is focused on reduction of energy requirements, on renewable energy generation and on regeneration of existing urban areas. These targets need to be solved with a systemic approach, considering several aspects simultaneously such as climate conditions, lighting conditions, solar radiation, PV potential, etc. The solar access analysis is an already known method to analyze the solar potentials, but in current years, simulation tools have provided more effective opportunities to perform this type of analysis, in particular in the early design stage. Nowadays, the study of the solar access is related to the easiness of the use of simulation tools, in rapid and easy way, during the design process. This study presents a comparison of three simulation tools, from the point of view of the user, with the aim to highlight differences in the easy-to-use of these tools. Using a real urban context as case study, three tools; Ecotect, Townscope and Heliodon, are tested, performing models and simulations and examining the capabilities and output results of solar access analysis. The evaluation of the ease-to-use of these tools is based on some detected parameters and features, such as the types of simulation, requirements of input data, types of results, etc. As a result, a framework is provided in which features and capabilities of each tool are shown. This framework shows the differences among these tools about functions, features and capabilities. The aim of this study is to support users and to improve the integration of simulation tools for solar access with the design process.

Keywords : energy building design tools, solar access analysis, solar potential, urban planning

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