Comment 1 on "Fast and accurate simulation of long-term daylight availability using the radiosity method"

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Comment 1 on "Fast and accurate simulation of long-term daylight availability using the radiosity method" by B. Geebelen, M. van der Voorden and H. Neuckermans.

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Discussion

Comment 1 on 'Fast and accurate simulation of long-term daylight availability using the radiosity method' by B. Geebelen, M. van der Voorden and H. Neuckermans

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Building performance simulation is a powerful technology for addressing interacting architectural and engineering issues in buildings. For more than a quarter of a century, building performance simulation programs have been developed to undertake non-trivial building (design) analysis and appraisals. The techniques 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. This paper by B. Geebelen et al. is yet another step in this process.

Although contemporary programs are able to deliver an impressive array of performance assessments, there are still many barriers to their routine use in practice, for example, in the area of quality assurance, and because the use is mainly restricted to the final stages of the building design process. This paper addresses both these important issues.

The quality of building performance predictions can be expressed in terms of 'how good is the model compared to reality?' as well as in terms of 'how useful is the model for real world applications?' This paper introduces methods which are very promising in terms of the latter, while ensuring that the correspondence between simulated results and reality will not be jeopardized.

The authors demonstrate that the simultaneous computation of daylight coefficients results in substantial improvements in calculation times. Optimizing of the surface-patch size is a good standard practice in modeling and indeed for daylight calculations (as opposed to visualization purposes) the number of patches can be reduced dramatically without losing too much in accuracy.

The paper would have been even stronger if a more realistic practical case study had been included; realistic in the sense of, for example, daylight control, time-variant properties of the transparent elements in the facade, non-diffuse reflecting materials and irregular floorplan.

In conclusion, the computational improvements presented in the paper promise to bring long-term daylight availability within the scope of early stage design-decision support tools. As indicated in the paper, there is still substantial research and development work to be done. Practice is eager to see fast and reliable long-term daylight availability prediction in industry-strength robust simulation environments so that these predictions can be used in daily practice.