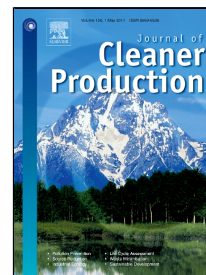


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Developing a robust assessment system for the passive design approach in the green building rating scheme of Hong Kong

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Abstract

This paper proposed a renovated passive design assessment system for green building labelling based on robust energy end-use statistics, different global sensitivity analysis methods, modelling experiments and a detailed case study. The developed system is only applied to cooling and lighting related criteria, which are mainly influenced by selected passive design strategies. After a preliminary definition of the assessment framework and total available credits, the priorities of different sub-criteria are derived from sensitivity analyses of a generic building model with screening-based, variance-based and regression methods. Adjustment of assessment criteria is also performed according to significance tests and post optimization analyses. Furthermore, performance and grading scales are formulated with baseline requirements, optimization results and local sensitivity analyses. Eventually, the FAST (Fourier Amplitude Sensitivity Test) method is proved to generate the most appropriate weighting system considering the consistence of the credit prediction with the traditional whole building simulation approach. Findings from this research can guide decision-makers in the construction industry to obtain an optimized preliminary design by properly allocating resources and investments under a prescriptive evaluation approach starting from the early planning stage. The research design can also be applied to determine the assessment system for other performance-based criteria in a green building assessment scheme.

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