

A Systematic Approach for the Thermal Design Optimization of Building Envelopes

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(Received September 25, 2004)

ABSTRACT: Early design decisions can be significant in determining the thermal performance of buildings. However, necessary information to base such decisions is rarely available. Implementation of systematic approaches to the design process can help in providing such information with the least cost. This article presents the development and validation of an optimization model that utilizes a direct search optimization technique incorporated with an hourly building energy simulation program for the optimum thermal design of building envelopes. The implementation results of the model to the design of office and residential buildings at different climatic conditions are also presented.

KEY WORDS: systems approach, optimization, building, envelope, thermal design, energy conservation.