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Abstract

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For Reference

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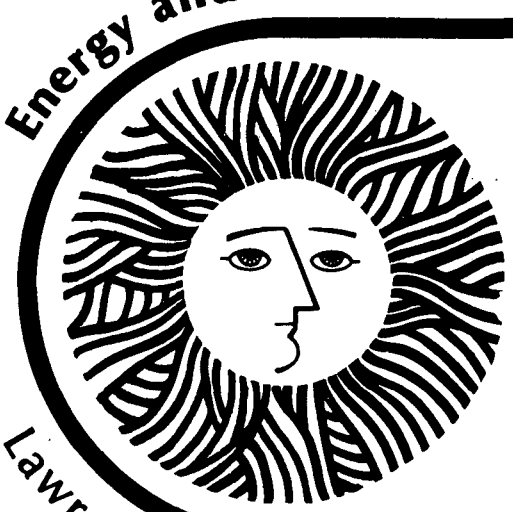
Energy and Environment Division



A Comparison of Three Building Simulation Models for Residences: TWOZONE, DOE-1 and NBSLD/BLAST

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June 1979

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A COMPARISON OF THREE BUILDING SIMULATION MODELS FOR RESIDENCES: TWOZONE, DOE-1 AND NBSLD/BLAST*

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Several related public domain building simulation models have recently been available to building designers for energy analysis. While these programs have been checked against experiment in a few cases, their availability has been sufficiently recent that no systematic comparisons between the programs has been available. Such comparisons are useful in determining the differences between the programs within their common range of applicability.

Three public domain programs--TWOZONE, DOE-1, and NBSLD/BLAST--are compared both in terms of their calculation methodology and modeling assumptions, and in terms of their results. We find some differences in the programs' treatment of internal heat transfers, and discuss their significance to predictions of annual heating and cooling loads. Annual loads are found to be generally consistent between the programs over a wide range of climates and conductivities. However, the differences can be important for some applications, particularly for passive solar buildings. These differences are discussed in terms of aggregate annual loads and in terms of hour-by-hour loads from individual building elements. It is concluded that none of the three programs treat internal heat transfers satisfactorily at present, and thus their applicability to analyzing passive solar design options is limited.

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