

PACKAGE ID - 000137IBMPC00 ASEAM2.1

KWIC TITLE - Simplified Building Energy Analysis

AUTHORS - Firevoid, J.A.

W.S. Fleming and Associates, Inc., Burke, VA (United States)

Willman, A.J.

ACEC Research & Management Foundation, Washington, DC (United States)

LIMITATION CODE - UNL

AUDIENCE CODE - UNL

COMPLETION DATE - 01/01/1988

PUBLICATION DATE - 10/01/1987

DESCRIPTION - ASEAM2.1 is a modified bin temperature program for calculating the energy consumption of residential and simple commercial buildings. It can be used to evaluate the individual or combined effects of various energy design strategies. Algorithms include heating and cooling load calculations based on a methodology documented by the ASHRAE Technical Committee on Energy Calculation (TC4.7) and HVAC system and plant calculation routines with options to size heating and cooling equipment and air flows. HVAC systems are configured by selecting among the various available system types, control options, heating plants, and cooling plants. ASEAM2.1 primarily employs ASHRAE (WYEC) bin weather data; however, it is capable of alternatively using the DOD (AF88) or Battelle (TRY) bin weather data. The user can also supply as input bin weather data from other sources, if desired. Basic system types included are: a double duct or multizone unit, a terminal reheat unit, a variable air volume (VAV) system, a ceiling bypass VAV system, a variable temperature single zone system, a 2 pipe or 4 pipe fan coil system, a water/air heat pump system, and a packaged terminal air conditioner unit. In addition, ASEAM2.1 contains: baseboard heaters, a furnace system, unitary heater, and a heating and ventilation unit. Available cooling plant types are: direct expansion, centrifugal chiller, absorption chiller, district chilled water, double bundle chiller, cooling tower and reciprocating chiller. Five heating plant types are available: electric resistance, hot water or steam boiler, district steam or hot water from a central plant system, forced hot air furnace, and an air to air heat pump or double bundle chiller. Two life cycle cost programs, FBLCC and NBSLCC, developed by the National Bureau of Standards, are integrated into ASEAM2.1.

PACKAGE CONTENTS - NESC Note; Software Abstract; User's Manual; Media Contains Source Code, Executables, and Sample Problems;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 16 5.25 Diskettes.

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METHOD OF SOLUTION - In deriving a building's annual and monthly energy consumption, the 'bin' method computes the energy consumption rate at selected outdoor temperature intervals. Annual energy consumption for the building is determined by performing the secondary system simulation and passing this consumption rate to the primary system (chillers, boilers, etc.), to be multiplied later by the number of hours duration at the specified temperature intervals. The temperature intervals, or bins, are groups of temperatures, usually in 5 degree Fahrenheit increments. The building's annual energy requirements are estimated by summing the energy requirements from each bin. For additional accuracy the bin calculation is performed separately for occupied and unoccupied hours as well as for heating and cooling seasonal space temperature setpoints.

COMPUTER - IBM PC

OPERATING SYSTEMS - DOS 2.0

PROGRAMMING LANGUAGES - IBM BASIC

SOFTWARE LIMITATIONS - Maxima of 13 system types, 10 thermal load zones, 7 cooling plants and 5 heating plants. ASEAM2.1 cannot model tilted roofs, closed loop fluid coolers, or air cooled condensers. The ASEAM series of programs are intended for use in estimating the design energy performance of smaller commercial buildings and those which are not extremely complex from an energy standpoint.

SOURCE CODE AVAILABLE (Y/N) - Y

UNIQUE FEATURES - A parametric processor mode allows the user to readily change selected variables in the input data files and to specify output variables of interest for which annual values are written to output files. Run time graphics can be obtained by use of the function keys while the calculations are performed, typically hour by hour for loads and bin by bin for systems and plant calculations. Given a limited amount of input data, such as building shape and dimensions, percent glass, space and system types, the quick input routine can, using default values incorporated in ASEAM2.1, write complete input files.

RELATED SOFTWARE - The HVAC system and plant calculations are derived from the DOE2 program. CONTROLITE1.0 is used for the daylighting calculations. Many of the ASEAM2.1 output files are written as ASCII data files that can be read directly into the Lotus 1-2-3 spreadsheet. ASEAM2.1 includes a Lotus worksheet template file consisting of many macros for formatting the Lotus compatible output files. The original APPLE II+ version of ASEAM was developed by W.S. Fleming and Associates, Inc. PEAR2.1 estimates energy and cost savings in single family houses from typical conservation

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RELATED SOFTWARE - (CONT) measures.

OTHER PROG/OPER SYS INFO - ASEAM2.1 will not run in the BASIC interpreted mode; a BASIC compiler is required.

HARDWARE REQS - 256K

TIME REQUIREMENTS - ASEAM2.1 can perform calculations for a five zone building in 7 minutes. Typical run time is approximately 25 minutes.

REFERENCES - James A. Fireovid and Lynn R. Fryer, ASEAM2.1 A Simplified Energy Analysis Method Users Manual, ACEC Research & Management Foundation report, October 1987; ASEAM2.1, NESC No. 9737.PC, ASEAM2.1 FDC Directories, National Energy Software Center Note 88-34, January 18, 1988.

ABSTRACT STATUS - Abstract first distributed March 1985. APPLE II+ version of ASEAM submitted May 1984, deleted January 1988. IBM PC version of ASEAM2 submitted August 1987, replaced by ASEAM2.1 January 1988.

SUBJECT CLASS CODE - T

KEYWORDS -

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SPONSOR - DOE/CE

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