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DOE-2 USER NEWS

: A COMPUTER PROGRAM FOR BUILDING ENERGY USE ANALYSIS

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BULLETIN BOARD

Item: The DOE-2.1C version of the program is now available. Please call or write to us at LBL for details on obtaining the new program. Articles describing the new features have appeared in the last 4 issues of the User News. Check the newsletter index in this issue for individual topics.

Item: The new DOE-2.1C documentation update package consists of a revised ***DOE-2 Supplement*** incorporating material for both 2.1B and 2.1C, a new ***BDL Summary***, which now includes a listing of the Materials Library for easy reference, and, for the first time since the basic 2.1 manual set in 1980, an updated and improved ***Sample Run Book*** (see the article in the next column).

Copies of the documents may be obtained from the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161, (703) 487-4650, order numbers DE85012580, -81, and -82, respectively.

Item: A Cross Index by Abbreviation of all commands and keywords in DOE-2 has recently been developed by this office. It is designed to facilitate the job of reading input created by those who make extensive use of the abbreviations supplied by BDL. We will begin publishing this index, in installments, in upcoming issues of the newsletter. Anyone in immediate need of a copy of the complete index may write or call us at the above address and we will mail you one.

DOE-2.1C SAMPLE RUN BOOK

The ***Sample Run Book*** serves multiple purposes and should be of use to beginning as well as experienced DOE-2 users. First, the sample inputs and corresponding outputs act as a check set which are used to compare results on the user's computer system against the results from the system on which the program was initially developed. The second purpose is instructional: a) the user is led through a series of typical simulations which illustrate the capabilities of the program, b) various input styles are displayed, including the use of defaults and abbreviations, free formatting of input, nesting of sub-command keywords within the command itself, and c) it acts as a vehicle to demonstrate the relationships between the inputs to LOADS-SYSTEMS-PLANT-ECONOMICS, for instance, the effect of peak shaving on operating costs for a time-of-day electric rate structure.

The new volume contains upgrades of the original Simple Structure runs, the 31-Story Office Building, the Medical Building, and the Residential Example. In addition, it includes the Daylighting Example and a Residence with an Attached Sunspace. Each sample run is preceded by a sketch of the building showing the zoning used in the input and the general appearance of the building. Descriptive material has been imbedded as comments in the input itself. All of the major new features since 2.1 are demonstrated, and an index has been included to easily locate them. Among the examples that illustrate special features or those requiring complex inputs are:

- Parametric input
- Sunspaces
- Daylighting
- Overhangs and fins
- Hourly reports
- Three-dimensional building geometry
- Altering DOE-2 code (functional values)
- Powered induction units
- Chilled water storage
- Peak shaving electric demand
- Sell-back to utility
- Electric utility rates; seasonal, time-of-day demand ratchets

BUGS DISCOVERED IN DOE-2.1C AND INTERIM SOLUTIONS

The following is a list of bugs discovered to date in the new version of the program. We encourage users to document suspected bugs, and report them to their computer service bureau, or to us.

NOTE: These bugs exist *only* in copies of DOE-2.1C distributed before July 1, 1985. If your installation received the tape prior to that date, please drop us a line and we will send you a paper copy of the modifications needed to correct these bugs.

CLASSIFIED INDEX

HOURLY REPORT PROGRAM

[1] In the hourly reports, the values reported for the SUM and AVERAGE summary variables, for temperatures only, will be incorrect if metric units are input and English units output, or vice versa. The conversion between English and metric units is not made correctly when the variable is a sum of temperatures.

Interim solution: None.

LOADS

[2] When using window shade management with the MAX-SOLAR-SCH keyword in conjunction with SHADING-COEF instead of GLASS-TYPE-CODE, the calculation of the transmitted solar gain will be incorrect if the SHADING-COEFs differ from window to window. This problem occurs in DOE-2.1B as well as in DOE-2.1C.

Interim solution: Use GLASS-TYPE-CODE on all windows if MAX-SOLAR-SCH is being used on *any* windows.

[3] In the daylighting calculation, windows in exterior walls with SHADING-SURFACE = YES are incorrectly taken to be completely shaded, so that no light from the sky or ground enters the windows. Direct light from the sun is not affected.

Interim solution: For daylit spaces (DAYLIGHTING = YES), do not use SHADING-SURFACE = YES on exterior walls with windows.

[4] If a sunspace (i.e., a SPACE with SUNSPACE = YES) has no interior windows, the solar gain calculation is not functioning correctly.

Interim solution: None.

[5] In sunspaces with more than one exterior window, the solar gain calculation is not functioning correctly.

Interim solution: None.

[6] If a space has DAYLIGHTING = YES but no LIGHTING-SCHEDULE assigned to it, then the values reported in the LS-G Report for AVERAGE and PERCENT ILLUM and GLARE will be incorrect. This problem occurs in DOE-2.1B as well as in DOE-2.1C.

Interim solution: Assign a LIGHTING-SCHEDULE to each space with DAYLIGHTING = YES. If the space has no electric lights, specify LIGHTING-KW or LIGHTING-W/SQFT = 0 and use a LIGHTING-SCHEDULE with values of 1.0 for all hours of the run.

BUGS DISCOVERED IN DOE-2.1C (Continued)

SYSTEMS

[7] For a sunspace with more than one interior wall, the following quantities are incorrectly calculated for the second and subsequent interior walls if these walls are delayed: absorbed solar radiation, window conductance, and transmitted solar radiation

Interim solution: None

[8] For a sunspace with a delayed interior wall, the inside surface heat flux is calculated incorrectly.

Interim solution: None

[9] If a sunspace and its adjacent spaces are served by different system types, the program will abort in subroutine SSFCOR.

Interim solution: None.

[10] For systems using a heatpump (HEAT-SOURCE = HEAT-PUMP), the electric heating energy reported in SS-H varies significantly depending on what computer system is being used. The values reported can be as much as a factor of 3 too high in spring or fall months. The problem is caused by a very small, unphysical heating load (<< one Btuh) which turns on the heatpump, and causes it to consume electricity. On some machines, these small numbers are rounded to zero, and the heatpump remains off. On other machines, typically those having word lengths greater than 32 bits, the numbers remain non-zero, and the heatpump turns on.

Interim solution: None.

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AMONG THE HONOLULU PAPERS

The following technical and symposium papers presented at the ASHRAE Annual Meeting, held in Honolulu June 23-26 describe various applications of DOE-2. Copies of these papers can be purchased from the Publication Sales Department, ASHRAE, Inc, (404) 636-8400. Order numbers appear at the end of each citation.

- *Characterization of Zone Dynamic Response for CLF/CLTD Tables*, by Sowell, E.F. and Chiles, D.C., (2898)
- *Zone Descriptions and Response Characterization*, by Sowell, E.F., (2899).
- *A Counter-Intuitive Effect of Mass on Zone Cooling Load Response*, by Chiles, D.C. and Sowell, E.F., (2900)
- *Energy Performance Analysis of Fenestration in a Single-Family Residence*, by Sullivan, R. and Selkowitz, S., (2910)
- *Commercial Building Energy Performance Analysis Using Multiple Regression Procedures*, by Sullivan, R., Nozaki, S., Johnson, R.L. and Selkowitz, S., (2911)
- *Comparisons of Four Computer Models with Experimental Data from Test Buildings in Northern New Mexico* by Robertson, D.K. and Christian, J. E., (HI-85-11.1).
- *Energy Performance of an Architectural Fabric Roof: Experimental and Analytical Results*, by Gridley, R.B., Hart, G.H., and Goss, W.P., (HI-85-11.4).
- *Validation of Hourly Building Energy Models for Residential Buildings*, by Sorrell, F.Y., Luckenback, T.J., and Phelps, T.L., (HI-85-13.2)
- *User-Effect Validation Tests of the DOE-2 Building Energy Analysis Computer Program*, by Hunn, B.D., Cappiello, C.C., and Diamond, S.C., (HI-85-13.3).

INDEX TO THE DOE-2 USER NEWS

A regular Summer feature of the newsletter is the cumulative subject/title index to all articles published herein.