THE DOE–2 USER NEWS

PUB-439

DOE-2: A COMPUTER PROGRAM FOR BUILDING ENERGY SIMULATION

Vol. 10, No. 4

Winter 1989

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☞ ☞ HANDS ON ☜ ☜

☞ Converting Metric Weather

Dr. Vladimir Bazjanac, Berkeley, CA, can assist DOE-2 users with metric weather tapes. Source metric weather files can be converted to unpacked weather tapes (English units) and packed in TRY format for use with DOE-2, providing that the originals have data arranged in TRY format. Special characters on the source, caused by old-style overprinting, are legal and are properly converted. Metric weather files must be submitted in ASCII on diskette or magnetic tape. If possible, a meteorological data sheet, with original 24-hour observations for a randomly selected day recorded on the sheet, should accompany the diskette or magnetic tape; this is needed for weather tape verification. For more information phone (415) 548-4440.

☞ Death, Taxes, and the NTIS!

Just like the inevitable "Death and Taxes", every year NTIS raises the price of DOE-2 documentation. Please check the inside back cover of this newsletter for new prices.

The good news from NTIS is that new 2.1D manuals are available. Prices and order numbers for new documentation are on the inside back cover of this newsletter.

☞ Time To Make Travel Plans

Feb 12-16 — *Controls: Operations and Maintenance*

Part of a Ten-Course Series on Air Conditioning Design. Sponsor: University of Wisconsin. Contact: Engineering Registration, The Wisconsin Center, 702 Langdon St., Madison, WI 53706. Phone: (608) 262-1299.

March 19-21 — *Energy Technology Conference and Exposition*

to be held in Washington, D.C. Sponsor: Government Institutes. Contact: ETC, Government Institutes, 966 Hungerford Drive #24, Rockville, MD 20850-1714. Phone: (301) 251-9250.

This work was supported by the Assistant Secretary, Conservation and Renewable Energy, Office of Buildings and Community Systems, Building Systems Division, United States Department of Energy, Contract DE-AC03-76SF00098.

DOE-2.1D Basic Manual

The Simulation Research Group is in the process of preparing a *Basic Manual*, which will cover the essentials of preparing standard DOE-2 inputs. The *Basic Manual* is scheduled for completion mid-1990. It will be a stand-alone piece of documentation directed at the new user. Availability of the Manual will be announced in the User News; it will be offered for sale through the National Technical Information Service.

We are planning to excerpt sections from the *Basic Manual* chapter on System Types in this issue and in the next three issues of the User News. For each system type the following information will be presented: (1) a short description of the system; (2) a schematic diagram of the system, on which we have keyed the system components to their associated keywords; (3) a suggested minimal input for a 1-zone building; and (4) a listing of additional capabilities for the system and the keywords that enable them.

In this issue we are starting with system type SZRH. We plan to present system types VAVS, PIU, and HP in Vol. 11, No. 1 [Spring]; types PSZ, PMZ and PVAV in Vol. 11, No. 2 [Summer]; and types PTAC, TPFC and RESYS in Vol. 11, No. 3 [Fall].

In order to give users a clearer idea of what we are proposing for the *Basic Manual*, printed below is an abridged Table of Contents. We encourage your suggestions for additional topics.

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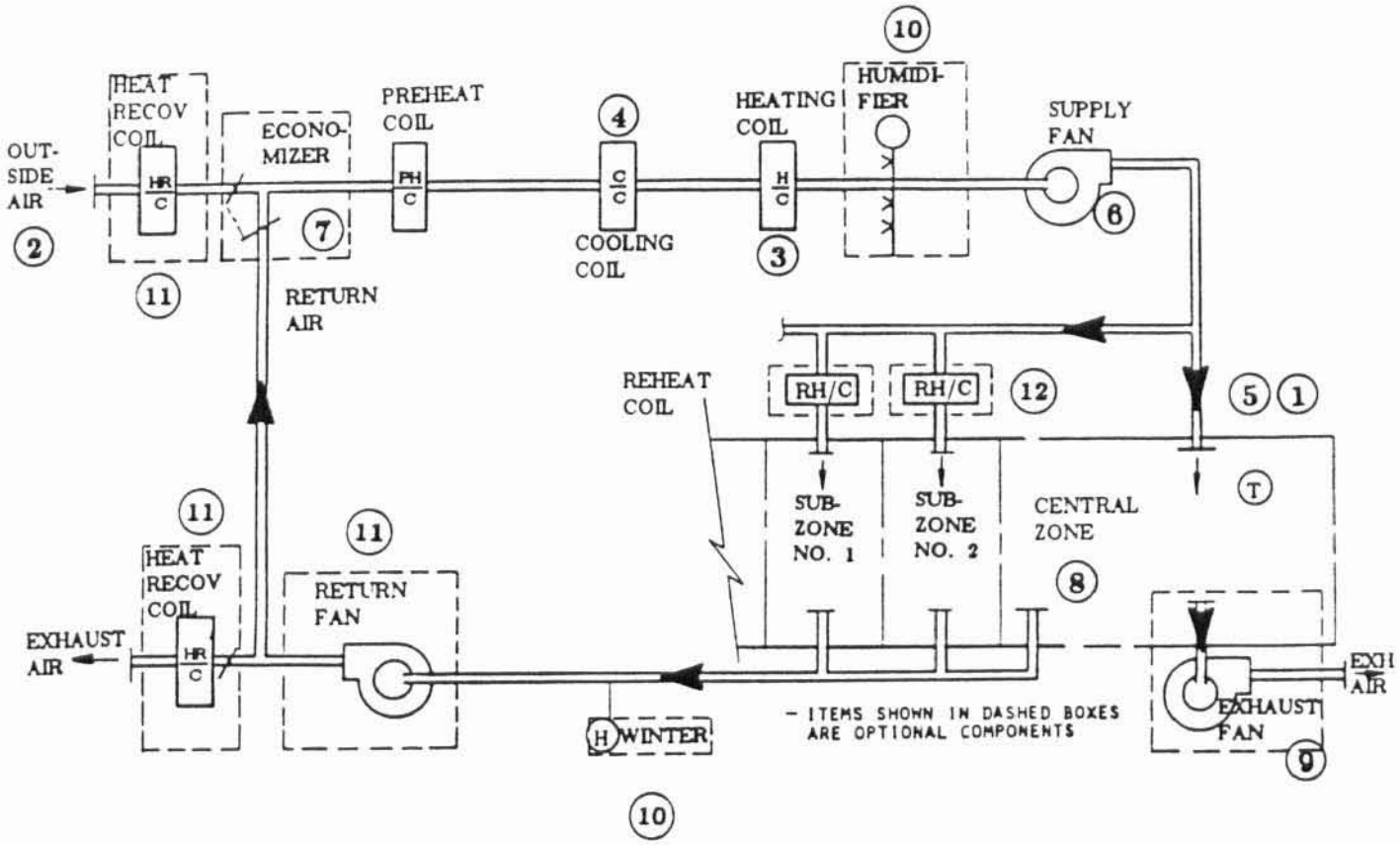
Single-Zone Fan System w/Optional Subzone Reheat (SZRH)

The single-zone type fan system (with optional subzone reheat) is illustrated in the schematic below. In its most basic configuration, the system provides constant volume, forced air heating and cooling for a single zone (plus subzones) from an air-handling unit containing a heating coil, a cooling coil, filters (not shown), and a supply fan. Exhaust fan(s) are optional for any or all zones. The temperature of discharge air is controlled from a thermostat that senses space conditions in the control zone. This zone is specified as the first zone entered under the keyword ZONE–NAMES. The system may be small and located within the space to be conditioned, or it may be remotely located with ducted air distribution. It may provide outside air ventilation, or merely recirculate conditioned air.



Suggested Minimal Input for SZRH with Economizer:

```
INPUT SYSTEMS ..

                        $SYSTEMS SCHEDULES

FANS-ON =       SCHEDULE THRU DEC 31    (WD)    (1,7)(0)(8,18)(1)
                                                (19,24)(0)
                                        (WEH)   (1,24)(0) ..
COOLSETPT =     SCHEDULE THRU DEC 31    (WD)    (1,7)(99)(8,18)(76)
                                                (19,24)(99)
                                        (WEH)   (1,24)(99) ..
HEATSETPT =     SCHEDULE THRU DEC 31    (WD)    (1,7)(55)(8,18)(72)
                                                (19,24)(55)
                                        (WEH)   (1,24)(55) ..


OFFICE = ZONE       DESIGN-HEAT-T       =   72
                    DESIGN-COOL-T       =   74
                    HEAT-TEMP-SCH       =   HEATSETPT (1)
                    COOL-TEMP-SCH       =   COOLSETPT
                    OA-CFM/PER          =   15 ..(2)

AC-SYST = SYSTEM    SYSTEM-TYPE         =   SZRH
                    MAX-SUPPLY-T        =   110 (3)
                    MIN-SUPPLY-T        =   55 (4)
                    NIGHT-CYCLE-CTRL    =   CYCLE-ON-FIRST (5)
                    FAN-SCHEDULE        =   FANS-ON (6)
                    ECONO-LIMIT-T       =   68 (7)
                    OA-CONTROL          =   TEMP
                    ZONE-NAMES          =   (OFFICE) ..(8)

SYSTEMS-REPORT      SUMMARY             =   (SS-A,SS-O)

END ..
COMPUTE SYSTEMS ..
INPUT PLANT ..
PLANT-REPORT SUMMARY = (BEPS) ..

SHW = PLANT-EQUIPMENT   TYPE = DHW-HEATER       SIZE = -999 ..
HWG = PLANT-EQUIPMENT   TYPE = HW-BOILER        SIZE = -999 ..
CHR = PLANT-EQUIPMENT   TYPE = HERM-REC-CHLR    SIZE = -999 ..

PLANT-PARAMETERS    BOILER-FUEL = NATURAL-GAS
                    HERM-REC-COND-TYPE = AIR ..

END ..
COMPUTE PLANT ..
```

Additional capabilities for SZRH system:

1) To enable an exhaust fan add the keywords EXHAUST-CFM = Value (CFM) and EXHAUST-KW = Value (.0001 is typical) to the ZONE keyword list. (9)

2) To enable a humidifier which requires heat to evaporate water into the air add MIN-HUMIDITY = Value (25% is typical) to the SYSTEM keyword list. (10)

3) To enable heat recovery to exchange relief air heat with outside air heat add RECOVERY-EFF = Value (0.6% is typical) and RETURN-KW= Value (.0003 is typical) to the SYSTEM keyword list. (11)

4) To disable the economizer change the OA-CONTROL = TEMP to OA-CONTROL = FIXED. (7)

5) To enable reheat coils at subzones add

   REHEAT-DELTA-T = Value (^{o}F) (12)

   to the SYSTEM keyword list.

6) To disable the mechanical cooling year-round, so that the system operates as a Heating and Ventilating Unit, insert a schedule like this:

   COOL-OFF = SCHEDULE THRU DEC 31 (ALL) (1,24) (0) ..

   and add COOLING-SCHEDULE = COOL-OFF to the SYSTEM keyword list.

Index to the DOE–2 User News

Volume 1, No. 1 (August 1980) through Volume 10, No. 4 (Winter 1989)

KEY: The Index lists *User News* volumes, issues, and page numbers as follows: Name of Article, in parenthesis is the program version that was current when article appeared, then Volume, Number (No. 1=Spring, No. 2=Summer, No. 3=Fall, No. 4=Winter), and page number.

For example, the entry "Advanced Simulation (2.1C)...7:4,4-8" tells the reader that the article titled "Advanced Simulation", which appeared when DOE-2.1C was the current version of the program, will be found in *User News* Volume 7:Number 4, on pages 4 through 8.

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DOE-2 Instructional Video and Manual
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Joint Center for Energy Management
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DOE-2.1D for Micros (MICRO-DOE2)
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Graphs from DOE-2
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■ ■ ■ ■ DOE-2 PROGRAM DOCUMENTATION ■ ■ ■ ■

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350/1-90 This work was supported by the Assistant Secretary, Conservation and Renewable Energy, Office of Buildings and Community Systems, Building Systems Division, United States Department of Energy; Contract DE-AC03-76SF00098. Lawrence Berkeley Laboratory is an equal opportunity employer.