THE DOE–2 USER NEWS

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DOE-2: A COMPUTER PROGRAM FOR BUILDING ENERGY SIMULATION

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☞ ☞ HANDS ON ☜ ☜

☞ **All 2.1C Bugs and Fixes** — See page 4 of this newsletter for a complete listing of 2.1C bugs and fixes; this is the last time they will be printed. *[Thank Goodness!!]*

☞ **Directory of Services** — DOE-2 has generated some ineresting program-related software and services. We have put together a directory of the software, services, and documentation offered (see inside back page of this newsletter). If you know of anything we've missed, please let us know.

☞ **Apply Yourself!** — The IBPSA application form has been modified slightly; it is printed on page 17.

☞ **For Your Library** —

Proceedings are available from the *Second International Conference on System Simulation in Buildings*, held December 1-3, 1986 at the University of Liege, Liege, Belgium. For more information, please contact Dr. Jean LeBrun, University of Liege, Laboratory of Thermodynamics, Rue Ernest Solvay, 21, Bat. C3, B-4000 Liege, Belgium.

Also, proceedings from the *Building Energy Simulation Conference* held August 21-22, 1985, in Seattle, WA, are still available. The contact person is Edward Knipe, 28231 Ridgepoint Court, Rancho Palos Verdes, CA 90274.

☞ **Conferences** —

Oct 27-29, 1988 -- *Microcomputer Tools for Building and HVAC System Design*, University of Colorado at Boulder, CO. Sponsored by the Joint Center for Energy Management and the Colorado Office of Energy Conservation. Call (303) 492-3915 or (303) 492-6551 for further information.

Nov 29-Dec 3, 1988 -- *Housing for the 90s*, Washington, D.C. Sponsored by: Energy Business Association. Contact Patricia Anderson, Conference Coordinator, Energy Business Association, 420 Maritime Building, 911 Western Avenue, Seattle, WA 98104. Tel: (206) 622-7171.

June 23-24, 1989 -- *BUILDING SIMULATION '89*, Vancouver, B.C., Canada. Sponsored by: IBPSA, the International Building Performance Simulation Association. Contact the Conference Coordinator: Dr. Marianne McCarthy, MCC Systems Canada, Inc., 30 Wellington Street East #202, Toronto, Ontario M5E 1S3, Canada. Tel: (416) 368-2959.

■ ■ ■ THE HEAT EXCHANGER ■ ■ ■

by

Bruce Birdsall

Question: **When it comes to "Schedules", I get confused. Could you give a simple explanation of how to use Schedules in DOE-2 ??**

Answer: "Load Profiles" in other computer programs are known as "Schedules" in DOE-2. There are three types of basic schedules used in BDL for the entire program:

1) DAY–SCHEDULE — Defines a day's hourly profile; a separate DAY–SCHEDULE is required for each type of day.

2) WEEK–SCHEDULE — Assigns each day of the week (MON, TUES, etc.) to a particular hourly profile (DAY-SCHEDULE).

3) SCHEDULE — Defines the types of week in the year; allows for the definition of calendar periods, such as summer vacations, etc.

In its simplest form, the input for DAY-SCHEDULE looks like:

U-NAME = DAY–SCHEDULE (hours covered) (values for each hour) ..

For example:

LTG–1 = DAY–SCHEDULE (1,24) (0,0,0,0,0,0,0,0,.3,.6,.8,1,1,1,1,1,1,1,0,0,0,0,0,0) ..

Optionally, this can be shortened by writing:

LTG–1 = DAY–SCHEDULE (1,8)(0) (9,11) (.3,.6,.8) (12,18) (1) (19,24) (0) ..

which is representative of the profile for a weekday. Always read the hour ending a period as the real start time for the next period; i.e., (1,8) (0) (9,11) (.3,.6,.8) ... indicates the lights were "off" until 8am and "on" from 8 to 11.

For weekends and holidays, let's assume that:

LTG-2 = DAY–SCHEDULE (1,24)(0) ..

The purpose of the WEEK–SCHEDULE should now be apparent; we have two day types — one that represents weekdays, and another for weekends and holidays. The form of the WEEK–SCHEDULE is:

U-NAME = WEEK–SCHEDULE (†) (**U-NAME** of **DAY–SCHEDULE** referenced) ..
† days of week covered

Using the previously defined DAY–SCHEDULEs LTG–1 and LTG-2, the example can be carried forward with:

```
NORMAL = WEEK–SCHEDULE   (MON,TUE,WED,THU,FRI) LTG–1
                         (SAT,SUN,HOL) LTG–2                    ..
```

Optionally, this can be shortened to:

```
NORMAL = WEEK–SCHEDULE (WD) LTG–1 (WEH) LTG–2                   ..
```

where (WD) stands for weekdays and (WEH) for weekends and holidays. If Saturday is considered part of the normal week, you have to write (MON,SAT) LTG–1 and (SUN,HOL) LTG–2.

To illustrate the purpose of the SCHEDULE, assume we have a school that is closed in the summer and on weekends and holidays. Therefore, we need another week type:

```
VACATION = WEEK–SCHEDULE (ALL) LTG–2                            ..
```

where (ALL) stands for all days of the week, including holidays, and LTG–2 was the DAY–SCHEDULE representing lights as being "off" for 24 hours.

In its simplest form, the input for SCHEDULE looks like:

```
U-NAME =SCHEDULE(THRU †)(U-NAME of WEEK–SCHEDULE referenced)    ..
† calendar period covered
```

To finalize the example:

```
LIGHTS = SCHEDULE  THRU JUN 10 NORMAL
                   THRU SEP 5  VACATION
                   THRU DEC 31 NORMAL                           ..
```

Another option, "nesting of schedules", can simplify the preparation of schedules. In the above example we could have bypassed the WEEK–SCHEDULEs by "nesting" the DAY–SCHEDULEs in the SCHEDULE itself. For example:

```
LIGHTS = SCHEDULE  THRU JUN 10    (WD) LTG–1 (WEH) LTG–2
                   THRU SEP  5    (ALL) LTG–2
                   THRU DEC 31    (WD) LTG–1 (WEH) LTG–2        ..
```

Further, if there had been no vacation period, the DAY–SCHEDULE as well as the WEEK–SCHEDULE could have been bypassed by "nesting" as follows:

```
LIGHTS = SCHEDULE THRU DEC 31   (WD) (1,8)(0) (9,11)(.3,.6,.8) (12,18)(1) (19,24)(0)
                                (WEH) (1,24)(0)                 ..
```

In the BDL for SYSTEMS, there are special requirements for DAY–RESET schedules, in PLANT there are DAY–ASSIGN schedules, and in ECONOMICS there are DAY–CHARGE schedules, but they all follow the same pattern described above.