ibpsaNEWS

NEXT IBPSA MEETING: NEW YORK

The next meeting of IBPSA will be held on **Saturday, January 19, 1991**, in conjunction with the ASHRAE Winter Meeting in New York, New York, USA. The Board of Directors will meet at 6:30 p.m., and the general membership will meet at 7:30 p.m. The meeting will be held in the Madison Room on the 2nd floor of the New York Hilton which is located in Manhattan on the Avenue of the Americas between 53rd and 54th Streets. This meeting is open to anyone interested in building simulation; only paid IBPSA members may vote. (For membership information, see the end of this newsletter.)

BUILDING SIMULATION '91: NICE CONFERENCE SHAPES UP

by Ed Sowell, IBPSA President

The **Building Simulation '91 Conference** in Nice, 20-22 August 1991, is coming together nicely. With the results of the second call for papers now in, it looks like we will have about 160 abstracts from which to select about 80 papers. This is an indication of good timing and location for the conference. At a December 2nd meeting in Liège with IBPSA President Ed Sowell and Board member John Mitchell, Conference Project Manager Rik Van de Perre also presented preliminary plans for social events and both cultural and technical tours in the unique area of the conference. Fund raising has also gone well, with sponsorship on both sides of the Atlantic. Rik also pointed out that in addition to presentation of papers, the conference will feature demonstrations of software for building performance assessment and design. There is still time for vendors and others interested in software demos to contact Rik on this matter. All indications are that Building Simulation '91 will surpass our very successful Vancouver conference. If you have not already done so, mark your calendars and begin your plans for a wonderful technical and cultural experience in August 1991!

LIEGE CONFERENCE A SUCCESS

by Ed Sowell, IBPSA President

The recent **Third International Conference on System Simulation in Buildings**, organized by the Laboratory of Thermodynamics at the University of Liège, and cosponsored by IBPSA was a resounding success December 2-5 in Liège. Held at the beautiful waterfront Place de Congres in Liège, the conference attracted the maximum target attendance of 75 persons, plus spouses. Attendees heard 34 presentations on topics including simulation for determining building control strategies, building modelling, HVAC&R (refrigeration!) component models, energy management, and new simulation methodologies. A major strength of the conference was the active participation of the audience, encouraged by shorter presentations, longer discussions periods, and high technical level of the attendees. Preprints of all papers were provided to all registrants prior to the meeting. Additionally, Belgian hospitality and fine foods were strongly in evidence at the three luncheons and at the social evening.

LIEGE CONFERENCE

Conference General Chairman Georges Liebecq and Laboratory Director Jean Lebrun are to be congratulated for their very successful event. We look forward to the Fourth of the series in 1994! **Conference proceedings** may be ordered from:

Georges LIEBECQ
University of Liège
Laboratory of Thermodynamics
Rue Ernest Solvay, 21-Bât C3
B-4000 Liège
Belgium

Phone: 32-41-52.01.80
Telex: 41.397 univlg b
FAX: 32-41-52.54.39

BEPAC NEWS

by Ed Sowell, IBPSA President

The **UK Building Environmental Performance Analysis Club** (BEPAC) held its Annual General Meeting in London, 11 December 1990. The activities and finances of the Club during the past year were reviewed by outgoing Chairman Steve Irving and Secretary/Treasurer Eric Keeble. Many of the achievements were attributed to the now-strong technical task groups, including ones on HVAC Controls, Air Movement in Buildings, Standards, Lighting, and Acoustics. Some of the TGs have already put forth one or more publications for benefit of BEPAC members and others in the industry, while others have planned professional development seminars. Each TG meets four times per year to plan and carry out activities in their specialty area, reporting back to the general membership at the Annual General Meeting. The meeting also included a technical program, with a presentation on the UK Energy Kernel System (EKS) by a team from Strathclyde, Bath, and Newcastle Universities. An afternoon workshop addressed the issues of the UK building research and postgraduate education needs, with the aim of making recommendations to the Construction Engineering Council.

IBPSA President Ed Sowell, a guest at the meeting, spoke about the upcoming Building Simulation '91 Conference and other IBPSA activities. IBPSA and BEPAC signed an affiliation agreement earlier this year to provide for sharing of information on one another's activities. The text of the agreement follows.

Affiliation Agreement Between BEPAC and IBPSA (June 1990)

1. This agreement is for the purpose of establishing mutual co-operation between BEPAC and IBPSA and to provide mutual benefits to their respective members. It in no way restricts the independence of either Society.

2. Members of one Society need not be members of the other Society.

3. Each society may send one or more non-voting representatives to meetings of the board of the other Society.

4. Each society will inform its members of the arrangements for joining the other Society, including details of membership rates and the necessary procedures for payment of subscriptions. However, neither society will collect membership fees on behalf of the other.

5. Each Society will publicise the activities of the other Society free of charge in its journals and newsletters.

6. Neither Society shall be in any way liable for legal, financial or other obligations incurred by the other Society.

7. Each Society may, at its sole discretion, offer benefits to members of the other Society, each such benefit being determined on a case by case basis by the Society offering the said benefit.

8. Persons living in the area served by one Society may join the other Society directly and will not become de facto members of the first Society.

9. Further mutual arrangements can be made between the two Societies.

10. This affiliation agreement may be terminated by written communications from one Board to the other.

GREETINGS TO BEPAC MEMBERS

Beginning with this issue, *ibpsaNEWS* will be distributed to the members of the Building Environmental Performance Analysis Club (BEPAC) in the UK. Welcome to *ibpsaNEWS*!

WILL PROGRAMMING LANGUAGES BECOME OBSOLETE FOR ENGINEERS?
A Survey of Engineering Tools and Integrated Building Software Activities

by Henry Amistadi

A. Status Report on Survey Activities of the IBPSA Research Project (RP-90-1)

IBPSA has funded work to prepare newsletter feature articles dealing with the subject of engineering software tools and integrated building software. A survey was created and was sent out to 210 addresses.

The mailing list was developed from the following sources: IBPSA, AEC Systems Show, Technical/Graphical Software Vendors including math, statistical, FEM, simulation, CAD, 2d & 3d graphical software, ASHRAE TC1.5 Computer Application Committee, KBS Subcommittee, Integration Workshop participants, LBL's DOE-2 Newsletter.

The mailings occurred in phases: IBPSA surveys were sent out in mid-October, the Technical/Graphical Software Vendors and ASHRAE TC 1.5 were sent out next, and the AEC Systems Show and Integration Workshop were just sent out. In January, the survey will be sent out with the DOE-2 newsletter.

At this time there have been only a few respondents. One reason for the meager response to date has to do with the limited time the people in the later mailings have had to respond. However, IBPSA members have had the survey longest and few have responded.

Please send in your survey forms!

A purpose of this feature is to introduce people to the concepts of engineering tools and integrated building software and to give examples of current research projects and applications to clarify who should respond to the survey.

B. The Ideal:

A concept of a building engineer's or scientist's "work bench" is described below by using an analogy.

A finish carpenter has a work bench, a platform on which to work. The tools hang on the wall. While working on a project he/she takes a tool off the wall for one task and another tool off the wall for a different task. Each tool serves a different purpose.

The mechanical engineer needs a work bench as well. He/she is designing or researching a system and needs to build a model. If he/she is a product engineer, he/she may have some test data of how the system actually performs. He/she may have drawings and specifications of the project. He/she may have equations for estimating the performance of the system. With these resources and the associated tools he/she can build a working model.

He/she may want to statistically analyze the test data or statistically compare the model and the test data. As the model operates, for given conditions, the engineer will want to visualize the system's performance parameters and tweak the system controls. Envision the process as driving a high speed car while watching the road and the car's gauges. The model should be tested over a range of operating conditions to find its strengths and weaknesses.

Once the model has been tested and is complete, many product designs can and will be simulated. System options can be compared and an optimization process used to determine theoretical ideals. The final design is then built and tested for a range of operating conditions. The results of this data are fed back into the model to improve the accuracy and depth of the model. Throughout the project the documentation drives the model. At the end of the project the documentation is complete.

C. The Reality

This story could come very close to reality within 5 years. There are highly developed general purpose mathematical and simulation languages currently available, which include 3D surface and vector field graphics. With some of these packages the engineer uses mathematical notation to define the calculations; thus the calculation is the documentation.

Data acquisition and analysis programs exist which combine graphics and statistical analysis. Finite element programs are available which allow you to geometrically construct a shape, apply heat transfer calculations to the shape, and graphically present the thermal results on the surface of the shape.

There are geographic/climatic information systems that could be coupled with building simulations to develop regional guidelines for a product. The results would be represented by 3D maps.

Massive information databases are now accessible. Compact disc reader technology is available and affordable. The National Institute of Building Science recently released a building standards database on CD. Object oriented programming, application independent user interfaces and EKS are directed toward generalizing and modularizing the uses of existing programming languages. Research toward standardizing CAD formats and building data formats is currently in progress.

D. Some Current Integrated Software Research Projects

Listed below is a small sampling of current research projects.

Computer Aided Building Design System (CABDS)

An APEC/industry partnership is developing a more efficient method for communicating information among designers, computer aided drafting, and equipment manufacturers. CABDS is a computer software database system that will allow engineering design programs, manufacturers' equipment selection programs and CAD systems to share common data and allow output generated by one program to be directly available to any other program that needs it.

APEC Subcontractor: James Jackson & Associates, Marion, Massachusetts. Contact: James Jackson

Information Exchange Technologies in the Building Process

NIST is analyzing, extending and refining a prototype semantic data model for "as-designed" building information to define architectural engineering and construction (AEC) requirements for product data exchange specification (PDES), the next generation data exchange standard. NIST is identifying elements required in the semantic data model to allow code-checking of a building design.

National Institute for Standards and Technology Building Environment Division, Gaithersburg, Maryland. Contact: Kent Reed

Energy Kernel System (EKS)

EKS provides a software environment for developing new simulation programs. It is intended to be an efficient way of creating simulation models that can be used in a stand alone fashion or for integration into multi-purpose environments such as computer aided design, expert systems, or energy management systems.

Lawrence Berkeley Laboratory, Simulation Research Group, Berkeley, California. Contact: Fred Winkelmann

Advanced Design and Operation Technologies (ADOT)

The purpose of the ADOT project is to produce intelligent computer based design and operation technologies for commercial buildings. The proposed research is to include computer-aided design, artificial intelligence, random access databases and advanced graphics and visualization systems.

Pacific Northwest Laboratory Richland, Washington. Contact: Mike Brambley

E. Examples of the Use of Generic/Engineering Tools for Building Applications

Anyone who has used a spreadsheet or mathematical software to perform building analysis is using a generic tool for building applications.

Anyone who runs an energy/design analysis program and brings the output into a spreadsheet or graphics program to examine the results is using a generic tool coupled with a dedicated program.

Anyone who is using a package that couples CAD with duct design is using a generic tool coupled with a dedicated program.

The examples listed above are uses that can be described on the generic tool survey (Form II).

F. Integrated Software Research Project Forum

If you have comments or questions about the survey call or write: Henry Amistadi, RR 2 Box 2191C, Brunswick ME 04011, 207-772-3900

I am willing to send the survey to interested organizations or individuals. If you have mailing lists for the sources listed below, please send them to me:

> AI Software, Integrated Monitoring and Control Software/Hardware, International Generic Software, International Architectural-Engineering-Construction Software, International Engineering Society Software Committees, Additional energy or design/analysis software mailing lists (e.g., DOE-2 Newsletter).

BUILDING SIMULATION '91 INFORMATION

2nd World Congress on Technology Improving the Energy Use, Comfort, and Economics of Buildings Worldwide

NICE, SOPHIA-ANTIPOLIS FRANCE
AUGUST 20-22, 1991

Sponsored by:
IBPSA, the International Building Performance Simulation Association

Cosponsored by:
Europe:	AFME, BAG, BEPAC, NOVEM, CEC-DGXII, JRC
N. America:	GRI, EPRI, DOE, USA-CERL, BPA, PWC

Supported by:
Major building simulation research groups, energy research institutes, leading engineering consultancies, energy suppliers and computer industry worldwide

Organized by:
SCSI, the Society for Computer Simulation International

Conference Context
The use of computer simulations for building and HVAC design, environmental performance assessment, or building management, is steadily increasing. Over the past decade -- as a result of intensive research programmes -- very sophisticated models have been developed, describing the complex thermophysical processes in and around buildings. The scope of current research is shifting more and more from fundamental physics and mathematics towards the use of the latest information technology available, in order to speed up the technology transfer from research to practice and to facilitate the communication between various partners involved in the building industry.

International research, in the field of environmental building performance assessment, is mainly defined by the IEA (International Energy Agency) and the CEC (Commission of the European Communities). In Europe, the CEC has taken a leading role to support research programs in the field considered, and is harmonizing building performance assessment methods, in the scope of the 1992 internal market.

In January 1987, after two years of preparatory work, the International Building Performance Simulation Association (IBPSA), was established by North-American and European researchers active in building simulation. This new international body, incorporated in Canada, created a permanent international platform for researchers and practitioners of building simulation, broadening the horizons of the many national and local groups such as ALMETH-France, BAG-Belgium and BEPAC-UK, amongst others.

In Europe and N-America, various successful international workshops in the field of Building Simulation have already been organized: Leesburg-US (Spring, 1983), Seattle-US (Summer, 1985), Ispra-I (November, 1987) and Ostend-B (September, 1988).

The first Building Simulation world conference (BUILDING SIMULATION '89, Vancouver B.C., June 1989), organized by IBPSA and attended by over 150 participants from a dozen countries, was high-standing and very successful.

August 1991 is an appropriate moment to link up various local initiatives, and to put them in a worldwide context. It is an excellent opportunity for corporations and researchers to get informed of the latest developments and to explore new possibilities for co-operation and joint ventures. Therefore, the BS'91 conference

will be another milestone in the European and trans-continental integration process in the field of building simulation.

Conference Themes
The conference intends to focus on six basic domains :

1. **Models for building performance analysis**
2. **Computer implementations**
3. **Programs and software**
4. **User-interfaces**
5. **Design integration**
6. **Technology transfer**

The **models section** deals with development as well as with validation activities:

1.1 Heat and Mass transfer
1.2 Comfort and Air Quality
1.3 Daylighting
1.4 Acoustics
1.5 Structural building modelling
1.6 Controls and Equipment

The **computer implementation section** covers:

2.1 Mathematical and numerical methods
2.2 General or specific solvers
2.3 Object oriented environments
2.4 Intelligent environments
2.5 Data-base structures
2.6 Graphical standards
2.7 Computer visualization
2.8 Real-time simulations

The **programs/software section** relates to public domain and commercial products:

3.1 Technical presentations
3.2 On-site demonstrations

The **user-interfaces section** pays attention to:

4.1 Dynamic user modeling
4.2 Intelligent front- and back-ends
4.3 Links between drafting and simulation environments

The **design integration section** addresses the following issues:

5.1 Multi-discipline and multi-stage design integration
5.2 Architectural and engineering design optimization

5.3 Computer integrated manufacturing
5.4 Building management
5.5 Energy policy and life-cycle cost analysis
5.6 Regulatory measures and industrial standards

The **technology transfer section** reports on how to match the needs of the building community with the potential of building simulation:

6.1 National case-studies
6.2 International case-studies

Other topics or sections related to building simulation may be proposed as well.

Conference Information

Conference Date and Location
The second world congress on Technology Improving the Energy Use, Comfort and Economics of Buildings Worldwide, called **BUILDING SIMULATION '91**, is hosted by the AFME (the French Energy Agency), and will run from **August 20 (9 am) until August 22 (4 pm) 1991**, at the **Nice/Sophia-Antipolis** site, on the **French Riviera**. The Nice international airport is within easy reach.

Intended Registration Fees
These registration fees include conference attendance, proceedings, three lunches, and refreshments during coffee-breaks. **IBPSA members receive a 10% discount.**

Early registration and authors
(before 15.04.91)..........165 ECU/198 USD

Late registration and non-EEC resident
('distant' participant)......200 ECU/240 USD

Late registration and EEC-resident
('close' participant).......250 ECU/300 USD

Hotel Accommodations
Hotel rooms for the duration of the conference will be available in downtown Nice for about 50 to 75 ECU (60 to 90 USD) per night. Transportation to the conference facilities will be organized.

Social Programs
The conference social program will consist of a 1-day spouses program, as well as a welcome party and a conference banquet.

Conference Tours
The conference might be preceded (or followed), by a four day 'cultural' tour in the North of Italy (Florence, Venice, ...). Several 'technical' tours are planned after the conference.

Conference Secretariat
All correspondence, or further enquiries, should be addressed to the **BUILDING SIMULATION '91 Conference** Secretariat:

> IBPSA-BS'91
> Society for Computer Simulation
> c/o Philippe GERIL
> Coupure Links 653
> B-9000 Ghent
> BELGIUM
>
> Telephone and fax: 32 91 23.49.41
> Telephone only: 32 91 23.69.61
>   ext. 232
> Fax only: 32 91 24.40.93
> E-mail: SCSI@BGERUG51.BITNET

Deadlines and Requirements

Reply card
Please fill in and mail the attached reply card immediately.

Abstracts
Extended abstracts (maximum two pages typewritten, without drawings or tables) were due in TRIPLICATE at the IBPSA-BS'91 conference secretariat before OCTOBER 26th, 1990.

Papers
An author kit with complete instructions for preparing a camera-ready copy for the proceedings, will be sent to accepted authors. The camera-ready copies of accepted papers must be submitted before **February 15th, 1991**. A final review of each paper will take place at that time. Only original papers, which have not previously been published elsewhere, will be accepted. In principle, all papers will be presented orally.

Author registration
Authors are expected to register early, before **April 15th 1991**, at a reduced fee, and to attend the conference, at their own expense, to present the accepted papers. If payment is not made by April 15th 1991, the paper will not be published in the proceedings.

Payments
All payments made prior to the conference, will be due in Belgian Francs. Credit cards (mail-order) and cheques will be accepted. At the conference, cash-payments may also be made in US Dollars and French Francs.

Language
The official conference language, and the language of the accepted papers, is English.

Special requests
If you plan to give state-of-the art reviews, or to organize panel discussions, please contact the IBPSA-BS'91 Conference Secretariat before November 1990. For computer demonstrations, exhibition space, video-sessions, or any other special request, please contact the IBPSA-BS'91 conference secretariat .

Conference Timetable

1. Mail reply-card .... Immediately

2. Abstracts expected by 26.10.90

3. Abstract reviews and notification
   of authors finished by 30.11.90

4. Preliminary program and
   registration forms sent out by
   .... 15.12.90

5. Papers expected by 15.02.91

6. Early and author registrations
   completed by 15.04.91

7. Final program and travel
   arrangements sent out 15.06.91

8. Conference starts on............... 20.08.91

Building Simulation '91 REPLY CARD

Participant Identification

Surname: _____

First Name: _____

Occupation/Title: _____

Affiliation: _____

Mailing address: _____

_____

City: _____ State: _____

Code: _____ Country: _____

Telephone: _____

Fax or Telex: _____

E-mail: _____

Conference Expectations

Yes, I intend to attend the BS'91 conference

( )   without presenting a paper, but indicating below the conference themes of interest to me:

_____

( )   proposing the following paper (please indicate max. 3 topic numbers or key-words):

Title: _____

_____

Co-authors: _____

Topic numbers: _____

Yes, I intend to take part in

( )   A 4-day 'cultural' pre-conference tour   ( )   A 4-day 'cultural' post-conference tour

( )   A 1-day 'technical' post-conference tour   ( )   A 2-day 'technical' post-conference tour

Miscellaneous information

( )   Yes, I would like to know more about IBPSA (activities and membership)

( )   Please, send also a call for papers to

Name : _____

Address : _____

_____

Mail this reply card immediately to: IBPSA-BS'91 Conference Secretariat
SCSI
c/o Philippe Geril
Coupure Links 653
B-9000 Ghent, BELGIUM

SOFTWARE ANNOUNCEMENTS

Editors' Note: Several of these announcements were submitted to ibpsaNEWS *several months ago. The Editors apologize to the software vendors for the delay in publishing this important information.*

☛ HyperLight (Submitted April 1990)

Hypertext

Hypertext is a way of structuring and retrieving information on a computer. Instead of reading documents one page after another the reader is encouraged to start with any topic of interest. A "frame" of information appears on the screen of the monitor. Within each frame several words or phrases will be highlit. Selecting a highlit item produces a further frame with its own highlights offering a choice of more information. The quest can go deeper and deeper or wider and wider as the reader chooses.

HyperLight

HyperLight is a hypertext package for lighting designers, devised by Bill Burt of Manchester University School of Architecture and Joe Lynes of Hull School of Architecture, England. Architectural students, for whom it was first written, have taken to it with great enthusiasm. Now its use is spreading to architects, consultants, lighting designers and luminaire manufacturers. They can browse through the information at their own speed, printing out the information they choose without being overwhelmed by data that they do not immediately need.

Availability

At present three disks are available for IBM-compatible PCs.

Disk 1 covers recreation buildings (libraries, theatres, sports halls and pubs) and also office buildings (administration, drawing offices and committee rooms).

Disk 2 covers retail premises (supermarkets, shopping centres and boutiques) and also education buildings (nurseries, schools and universities).

Disk 3 covers industrial buildings (factories, workshops and hazardous areas) and also display lighting (for exhibitions, museums and art galleries).

3.5-inch disks are obtainable from W. Burt, 444 Parrs Wood Road, Didsbury, Manchester M20 0GP, England.

5.25-inch disks are obtainable from J. Lynes, 4 Aigburth Avenue, St. Georges Road, Hull HU3 3QA, England.

Sample disks for evaluation cost only £5, but users who decide to retain and use HyperLight should pay a further £30 per disk. This buys a site licence, an updated disk and news of future releases. Cheques should be made payable to W. Burt or J. Lynes.

Plans

Further disks are in preparation. By the end of 1990 all common building types should be covered. Interactive calculations and graphics will follow. A version for the Macintosh HyperCard is under consideration and overseas versions will certainly be commissioned if there is a demand from outside the UK.

☛ DOE-2.1D (Submitted May 1990)

A new version of the DOE-2 program, DOE-2.1D, is now available. It replaces DOE-2.1C, which was released in 1984. DOE-2.1D is upwardly compatible, so that 2.1C input files will run on 2.1D with no changes. DOE-2.1D will run on a variety of computers, including DEC VAX, Sun, and IBM PC compatibles.

New Features

The major new features of DOE-2.1D are the following:

Gas-fired cooling equipment

Models have been added for three different types of gas-fired cooling equipment:

Desiccant cooling system

This is a small packaged unit (5 to 10 tons, 1800-3600 cfm) that uses a desiccant wheel in conjunction with direct and indirect evaporative cooling, instead of the usual DX coils. A gas-fired hydronic heater is used to regenerate the desiccant and to provide heating.

Direct-fired absorption chiller

This is a gas- or oil-fired two-stage absorption chiller with optional heating capability. These units are commercially available in sizes ranging from 100 to 150 tons.

Engine-driven chiller
This is a compression chiller driven by a natural-gas internal combustion engine. Hot water can be recovered from the engine exhaust and coolant to provide space heating or to run an absorption chiller for extra cooling or for greater overall efficiency.

Ice storage simulation

The DOE-2.1D PLANT program contains a new, component-based ice-storage model called CBS/ICE, developed for ASHRAE by the University of Texas Center for Energy Studies. With CBS/ICE users can configure a large variety of static (ice-on-coil) systems by linking together system components such as evaporator, ice tank, compressor, condenser,controller, etc. Because CBS/ICE does an iterative calculation each hour, it is fairly slow, so that users will find it most useful for modeling a few typical days of operation at a time.

Input functions in SYSTEMS

This allows users to modify the DOE-2 calculation without recompiling the program. Users can write their own algorithms in a FORTRAN-like language and place these algorithms in the BDL input. The algorithms will then be automatically incorporated into DOE-2 as a supplement to the standard hourly calculation. Previously available in LOADS, this feature has been extended in DOE-2.1D to SYSTEMS. One application of this feature is to model innovative HVAC control schemes that cannot be simulated by the regular program. This feature is designed for advanced users only since it requires knowledge of those parts of the DOE-2 code that the user wants to modify.

Input macros

This feature increases the flexibility of BDL. It is intended for advanced users who are already familiar with preparing BDL input. Input macros can be used to:

- Define a block of input (a wall, a schedule, or a space, for example) and associated parameters. The block can then be used over and over again in the input with different values for the parameters.

- Selectively accept or skip portions of the input. One could, for example, have BUILDING-LOCATION inputs for ten different cities, but select only the one corresponding to the weather file being used for the run.

- Perform arithmetic and logical operations. In particular, this allows keywords to be set equal to the result of adding, subtracting, multiplying, or dividing other values.

- Incorporate external files containing pieces of BDL into the main BDL input stream. This is the basis of the general library feature (see below).

General library feature

The input macro feature allows the user to merge other files into his BDL input by using the new "##include command". These files could contain previously prepared BDL descriptions of individual building components (walls, windows, schedules, whole spaces, HVAC systems, etc.). An example would be to assemble a set of files, each file containing the lighting, occupancy, and equipment schedules for a particular building type (office, retail, etc.). This would then be a schedules library that could be used over and over again.

Improved window calculations

Because heat gain and loss through windows can have a large impact on energy performance, the window thermal calculation has been improved. This includes:

- Automatic calculation of the shading of diffuse solar radiation by neighboring buildings and by architectural elements such as overhangs. Previously, only the shading of direct solar radiation was automatically calculated.

- Improved calculation of diffuse solar radiation from the sky falling on windows (and other exterior surfaces).

- Improved calculation of infrared radiation loss from windows (and walls and roof) to sky and ground, taking into account hourly-varying atmospheric conditions such as humidity and cloud cover. Blocking of infrared by overhangs, etc., is also accounted for.

Enhancements to residential natural ventilation

In DOE-2.1C the user had considerable control over when natural ventilation occurred for the

residential system (RESYS), but was forced to guess the air change rate when the windows were open. DOE-2.1D increases the user's ability to control when venting occurs, and, more importantly, adds a calculation of the ventilation rate.

Miscellaneous Changes
In addition to the above major changes, a number of minor improvements have been made in DOE-2.1D. These include the following:

* Lower case letters are now allowed in BDL input. The maximum number of SCHEDULES has been increased from 40 to 60.

* A new keyword AREA/PERSON in SPACE-CONDITIONS eliminates calculating the NUMBER-OF-PEOPLE for each space.

* To help in sizing thermal energy storage systems, report SS-J now shows the peak integrated cooling load for a 24-hour period and the day of the year that it occurs.

* An option has been added to write a binary file of hourly report data. This file can then be used as input to a postprocessor program (provided by the user -- not part of DOE-2) for graphing, making tables, histogramming, statistical analysis, etc.

Documentation
Three manuals were updated for 2.1D:

* DOE-2.1D BDL Summary
* DOE-2.1D Supplement
* DOE-2.1D Sample Run Book

The Supplement describes how to use the new program features in 2.1D as well those added in 2.1B and 2.1C. It is designed for use as a supplement to the DOE-2.1A Reference Manual. (The DOE-2 Engineers Manual and the DOE-2 Users Guide have not been updated for 2.1D.)

Obtaining DOE-2.1D
DOE-2.1D source code may be obtained from three sources:

1. National Energy Software Center
   9700 South Cass Avenue
   Argonne, IL 60439

Contact Ms. Jan Carter for details on their software purchase plan.

2. National Technical Information Service
   5285 Port Royal Road
   Springfield, VA 22161

   The order number for the source code is DE-830-48782. NTIS is the ONLY source for DOE-2 documentation.

3. Lawrence Berkeley Laboratory
   Simulation Research Group
   Bldg. 90, Room 3147
   Berkeley, CA 94720

   To get 2.1D for a VAX, send LBL one blank 2400-ft computer tape, certified for 1600 bpi. The tape is shipped via first class mail only, so please include $5.33 in postage stamps (do not send check or cash, STAMPS ONLY). To get a SUN/UNIX version of 2.1D, send one blank cartridge (type 3M DC-600A or equivalent), along with $2.50 in postage stamps.

Two PC versions are available. For more information on these contact:

Acrosoft International
9745 E. Hampden Avenue
Denver, CO 80231
(303) 368-9225

ADM Associates, Inc.
3299 Ramos Circle
Sacramento, CA 95827
(916) 363-8383

To be put on the DOE-2 newsletter distribution list, to submit articles, corrections or updates to documentation, or for DOE-2 program questions and information, please contact:

Kathy Ellington
Simulation Research Group
Bldg. 90, Room 3147
Lawrence Berkeley Laboratory
Berkeley, CA 94720

Phone: (415) 486-5711
FAX: (415) 486-5172
E-mail: kathy%gundog@lbl.gov

☛ TRNSYS *(Submitted July 1990)*

TRNSYS is a modular system simulation program. It recognizes a system description language which is used to specify the components that constitute the system and the manner in which they are connected. The TRNSYS library includes many of the components commonly found in thermal energy systems, as well as component routines to handle input of weather data or other time-dependent forcing functions and output of simulation results. Care has been taken to make the addition of user-written components easy.

TRNSYS is written in standard FORTRAN 77 and is available for mainframe, IBM-compatible and Macintosh computers. (The Macintosh version will be available with the release of 13.1. It does not use Macintosh-style buttons, menus, etc.) A FORTRAN compiler capable of handling the entire set of FORTRAN 77 commands is required. For personal computers, a hard disk and a math co-processor are recommended.

TRNSYS is developed and maintained by the Solar Energy Lab at the University of Wisconsin (For further information, contact: Ruth Urban, University of Wisconsin, Solar Energy Lab, 1500 Johnson Drive, Madison, Wisconsin 53706; Phone: (608) 263-1589, FAX: (608) 262-6707). The Solar Lab publishes periodic newsletters for all TRNSYS users and other interested persons. The Laboratory of Thermodynamics at the University of Liège , Belgium (Phone: +33-41-52.01.80 line 183, FAX: +33-41-52.54.39) coordinates the activities of the European TRNSYS Users' Group and also distributes and supports TRNSYS. INET Barth, Fisch, Kubler in Stuttgart, Germany (Phone: +49 711 649 8785, FAX: +49 711 685 3242) organizes TRNSYS activities for German-speaking TRNSYS users and also distributes and supports TRNSYS. A TRNSYS users' group has been formed in France (Phone: +33 78 93 39 85, +33 78 89 71 55). The Solar Lab will assist TRNSYS users in contacting other users in their region.

TRNSYS 12.2 has been distributed for the past several years, and TRNSYS 13.1 is now available from the Solar Energy Lab as well as Liège and Stuttgart.

TRNSYS 13.1 new features include additional simulation and component control commands: EQUATIONS (allows algebraic equations to be constructed without the use of the TYPE 15 component), ACCELERATE (can speed convergence in some simulations), LOOP-REPEAT (can speed convergence in simulations with a few tightly-coupled components), DFQ (allows user to choose one of three methods of numerically solving differential equations), NOCHECK (allows component inputs to be removed from the convergence checking process), ASSIGN (allows data and output files to be opened from within a TRNSYS deck), and FORMAT (allows user to specify a FORMAT statement for two types of output components); improved solar radiation processor, psychrometrics and weather generator components; and a completely updated manual. Up to 75 units can be used in a simulation, lower case commands are accepted, and user-written output subroutines are supported. All user-written components used with version 12.2 can be used with version 13.1; decks used with 12.2 can be used with version 13.1 with very few modifications.

The Solar Energy Research Center in Borlange, Sweden had recently announced the release of PRESIM, a graphical front end for TRNSYS. PRESIM runs on IBM-compatible computers (preferably AT-class or faster with a mouse and an EGA or VGA screen). PRESIM allows users to graphically create, store, retrieve and change system models. The user interface is similar to that of a Windows or Macintosh program. PRESIM 1.0, compatible with TRNSYS 12.2, is available from Borlange and TRNSYS distributors. The next version of PRESIM, which will handle all of the new TRNSYS 13.1 features, is being developed (free upgrades will be offered to PRESIM 1.0 users). Further information can be obtained from the PRESIM coordinator (Phone: +46 243 73400 and FAX: +46 243 73750), or from the TRNSYS distributors listed above.

☛ TRANE C.D.S.
(Submitted December 1990)

The Customer Direct Service (C.D.S.) Network of the Trane Company continues to enhance their design, analysis and selection program offerings. Two major enhancements during 1990 were with regard to the energy and economic analysis program TRACE 600 and the

AutoCAD interface to the distribution design package.

TRACE has been available since 1972. TRACE 600, the sixth generation of the energy and economic analysis program, has been available to operate on personal computers since 1988. However, in July of 1990 the current version of software received certification as an alternative analysis program for compliance with the California Energy Commission Title 24 standard. After exhaustive comparative analysis, TRACE 600 was given a certification multiplier of 1.025. This indicates that for the test suite conducted, TRACE 600 was found to be overall within 2.5% of the standard DOE-2.1C values.

In addition, many new features are now available with the program. These include:

- Natural Daylighting -- permits users to analyze the potential benefit of using natural daylight to offset standard indoor lighting.

- DIF Output -- TRACE 600 can now generate output files in standard Data Interchange Format (DIF) so that the data may be imported into graphic packages such as LOTUS 123.

- On line help options for output interpretation.

- Input templates of over 25 typical buildings.

- Step-by-step input for common system options through the TRACE Cookbook.

For many years the C.D.S. Network has offered both duct and water piping design programs. These programs have been used to design tens of thousands of distribution networks. In 1990 further productivity enhancements were announced with the completion of an interface package between the design programs and AutoCAD.

The concept is that a user enters the AutoCAD environment and loads or creates the building floor plan. Then, using a mouse or digitizer, they simply sketch a single line diagram where the ductwork or piping is intended to be installed. After entering some general job information the interface package extracts the dimensional data and creates an input file for the

design programs. The user executes the design programs and then imports the data back to the AutoCAD environment. The interface package then completes the drawing with a fully annotated double line drawing for the duct systems and an annotated single line drawing for the piping systems.

This is a tremendous productivity enhancement, but when changes are required the true potential of the system is utilized. By simply erasing the portion of the system that needs to be modified, and then re-sketching just that portion, the design may be completely revised in a matter of a few minutes.

These programs are just a few of the many software tools available through the C.D.S. Network. Additional information may be requested by calling the C.D.S. Support Center at 608-787-3926.

PUBLICATIONS AVAILABLE

BEPAC Technical Notes

BEPAC Technical Note 90/2 *"A set of standard dwellings -- Details of dimensions, construction and occupancy schedules"*, by E.A. Allen and A.A. Pinney, ISBN 0 187 212 6030. Price: £12 (BEPAC members £6), available from BRE Bookshop, Garston, Watford WD2 7JR, UK. Free review copies are available from the BEPAC Secretariat at the same address (Telephone 0923 664132).

This report published by BEPAC, the Building Environmental Performance Analysis Club, aims to improve the consistency of energy modelling of dwellings by providing detailed specifications of a set of standard example dwellings. These cover a number of common UK dwelling types, and include all the information necessary for energy simulation using dynamic or non-dynamic programs. While it would be impracticable to include examples of all the designs of housing which exist in the United Kingdom, or all the possible lifestyles of their occupants, the example dwellings can be used for two main purposes:

1. As benchmarks to compare predictions by different programs, or different people using the same program.

2. As representative dwellings on which to test design or refurbishment options.

The specifications also serve as examples and guidelines for the level of documentation needed to fully define a building for energy calculations, supporting BEPAC's aim to define and encourage good practice in the use of models for the prediction of building environmental performance.

Other BEPAC technical notes are also available at the same price:
Technical Note 89/1, *"Predicting hourly internal daylight illuminances for dynamic building energy modelling,"* compares methods of predicting hourly daylight levels with measurements.

Technical Note 89/2, *"The documentation and evaluation of building simulation models,"* describes a structure for evaluating large complex models on broad criteria, and applies it to three models: ESP, HTB-2, and SERI-RES.

FORUM

Dialogue of interest to the IBPSA membership may be submitted for publication in this section of *ibpsaNEWS*. Letters which are addressed to a specific individual will be forwarded for reply prior to publication. The editors reserve the right to edit all submissions.

MEMBER NEWS

Please submit information regarding promotions, moves, or other personal news of interest to the IBPSA membership. Please send to the address listed below; indicate clearly if any information should not be published.

UPCOMING CONFERENCES AND MEETINGS

ASHRAE Winter Meeting
January 19-23, 1991
New York City, New York, USA

For more information, contact:

ASHRAE
1791 Tullie Circle, NE
Atlanta, GA 30329-2305

Symposium on Building Systems Automation and Integration
June 2-7, 1991
University of Wisconsin-Madison
Madison, Wisconsin, USA

Organized by the Thermal Storage Applications Research Center, UW-Madison.

The abstract deadline was December 13, 1990, and the preliminary program has been established. However, abstracts are still being accepted for consideration to be included in the printed handbook/proceedings.

For more information, contact:

Building Systems Symposium
c/o Thermal Storage Applications Research Center
University of Wisconsin-Madison
150 E. Gilman Street, Suite 1200
Madison, Wisconsin 53703-1493
USA

Prof. Charles E. Dorgan
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Mr. Ronald Wooldridge
Syska & Hennessy, New York City
Phone: 212-979-3679
FAX: 212-979-3611

The 3rd International Symposium on Systems Research, Informatics and Cybernetics (InterSymp '91)
August 12-18, 1991
Baden-Baden, West Germany

Sponsored by The International Institute for Advanced Studies in Systems research and cybernetics and Society for Applied systems Research.

This meeting will include a Special Focus Symposium on "Computer-User Partnerships in Design," with particular reference to:

- Computer tasks vs. designer tasks

- Human factors aspects of computer-user interactions

- Computer-based design assistance tools

- Integrated computer-based design environments

- Computer-based design education

- The design workstation of the future

Abstracts are due March 9, 1991; full papers are due May 12, 1991.

For more information, contact:

    Jens G. Pohl
    InterSymp '91
    CAD Research Unit, SAED
    Cal Poly
    San Luis Obispo, CA 93407
    USA

    Phone: 805-756-2841
    FAX: 805-756-5986

Building Simulation '91
August 20-22, 1991
Nice/Sophia-Antipolis, France

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