

HTRI Celebrates New Headquarters

On April 20, 2001, HTRI celebrated the grand opening of our new worldwide headquarters in College Station, Texas, USA. The Bryan-College Station Chamber of Commerce, represented by President and CEO Royce Hickman, organized the ribbon-cutting ceremony. Dignitaries from local city and county government, members of the HTRI Board of Directors, Technical Committee, staff, and guests attended the event.

In her address, HTRI President and Chief Executive Officer, Claudette D. Beyer noted that this is the first building that HTRI has owned in 39 years of operation. The new building includes facilities for training and meetings, and allows for expansion. She thanked the City of College Station, Brazos County,



William Boyle and Claudette Beyer cut ribbon

and the Bryan-College Station Economic Development Corporation (EDC) for the grant of land and tax abatements that facilitated this corporate expansion.

Beyer also acknowledged the contributions of others: bankers, architect, construction company, and myriad contractors. She expressed special gratitude to HTRI staff who attended to details in the construction, the electronic infrastructure, and the actual move; the transition was completed within a week without interrupting member service.

HTRI Board Chair William M. Boyle expressed the board's appreciation to the community for its continued support of HTRI and to Beyer for making the "vision" a reality. His remarks were followed by praise for HTRI's good corporate citizenship from Lynn McIlhaney, Mayor of College Station; Joe Horlen, chair-elect of the Board of the EDC; Jerry Fox, board member of the Bryan-College Station Chamber of Commerce; and William Thornton, Brazos County Commissioner.

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HTRI Recycles

CC News

A New Communication Committee (CC) in Germany

The organizational meeting of CC-Germany was held at BDT Engineering – Balcke-Dürr Energietechnik GmbH in Oberhausen, Germany, on April 4, 2001. Dr. Heiko Stiens of BDT Engineering initiated this effort with the full support of HTRI. The following companies were represented at the meeting:

- ABB Lummus Global GmbH
- BDT Engineering - Balcke-Dürr Energietechnik GmbH
- GEA Luftkühler GmbH
- Henkel KGaA
- Krupp Uhde GmbH
- Linde AG
- Lurgi AG
- SSE GmbH (SCHELL Software & Engineering)
- TESSAG Edeleanu GmbH

HTRI Communication Committees provide an official forum for members in geographic proximity. These member-initiated and member-managed committees facilitate and formalize input, helping our customers throughout the world to communicate their opinions and needs to HTRI. The first CC was established in Holland in 1994; additional CCs have been organized in the United Kingdom, Singapore, Japan, Korea, and the USA.

For the latest information about HTRI software descriptions, future events, and registration forms, visit HTRI on the web at:

www.HTRI-Net.com



COFTF Meets

The second meeting of the HTRI Crude Oil Fouling Task Force (COFTF) was held on April 18, 2001, in College Station, Texas, USA. The COFTF was formed to review the status of current research, to offer advice on interpreting research data, and to provide guidance for the future direction of HTRI crude oil fouling research. Among its goals are improving the economics of crude oil preheat train operation.

Attending were members David King, BP p.l.c.; Himanshu Joshi, ExxonMobil Research and Engineering Company; Scott Stomierowski, Equilon Technology Company; and COFTF Chair Joe Palen, HTRI. Stan Kistler, Fernando Aguirre, and Claudette Beyer of HTRI also participated. At this meeting the members compared initial field data with HTRI experimental data; they concluded that the data agreed sufficiently and that similar fouling tests should continue.

The COFTF will meet again in conjunction with the 2001 Annual Meeting of Stockholders.

2001 Research Retreat

HTRI held a Research Retreat on April 21, 2001, in College Station, Texas, USA. The retreat provided an opportunity for members of the HTRI technical staff and invited representatives from industry and academia to focus on long-range industrial needs. The group explored how HTRI might adapt its technology to address emerging trends and expand its reach into new and non-traditional markets.

Joining the staff in the daylong session were T. M. Rudy, ExxonMobil Research and Engineering Company; Hans Müller-Steinhagen, Institute for Technical Thermodynamics, German Aerospace Centre; J. R. Thome, Swiss Federal Institute of Technology; S. W. Johnston, Shell Chemical Company; B. G. Ashenart, S & B Engineers and Constructors, Ltd.; J. J. Delorme, Technip; H. M. Joshi, ExxonMobil Research and Engineering Company; and H. Miyamoto, Ishikawajima-Harima Heavy Industries Co., Ltd.

The presentations, open discussion, and brainstorming session will help HTRI develop effective strategies, formulate new research programs, and create software to meet the needs of its members and to face the challenges of an ever-changing business environment.

HTRI

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Technical support is available from all HTRI offices as well as from representatives in India and South Africa.

Ten-Year Service Awards

Fernando J. Aguirre, Vice President, completed ten years of service at HTRI on January 2, 2001. Hired as a Senior Research Engineer, Fernando worked in software development and research until he was promoted to Director of Research in 1994. He assumed the position of Director of Marketing and Business Development in 1996 and was promoted to Vice President in 1999. Currently, Fernando not only leads HTRI's marketing and business development efforts but also provides leadership, management, and technical expertise to complement our research and software development. He has been instrumental in increasing HTRI membership and expanding our presence internationally. Over the past decade, Fernando has conducted more than 40 training sessions throughout the world. Last year, he established the HTRI European office in Surrey, United Kingdom, and directed the opening of the HTRI Asian office in Japan.

Fernando, a licensed professional engineer in Texas, holds a Ph.D. in Chemical Engineering from the University of Pittsburgh. Prior to joining HTRI, Fernando was employed at Bethlehem Steel Corporation as a research engineer, and at the University of Nevada as an Associate Professor of Chemical Engineering. He is an active member of AIChE, having served in many capacities, including director of the AIChE Heat Transfer and Energy Conversion Division.

Fernando's engineering expertise, management acumen, commitment to quality, and drive for success make him a key member of management. His leadership skills and innovative contributions, combined with his tireless efforts, have played an integral role in HTRI's success of the past ten years.



F. J. Aguirre

James M. (Mike) Creagor, Research Facility Manager, marked his tenth year of service at HTRI on March 4, 2001. A native of College Station, Texas, USA, Mike completed several training programs—firefighting, chemical operator process, and power plant operations—that provided him with a broad range of skills. In addition to his extensive experience as a firefighter, electrician, and construction foreman, Mike also worked for several years as a lead process operator at Oxid Chemical, Inc. and as a power plant operator at the Texas Municipal Power Agency.



J. M. Creagor

Since joining HTRI, Mike has managed all operations at the HTRI multi-million dollar experimental research facility that includes four operating research units, an on-site laboratory and machine shop, and supporting equipment and facilities. He has an excellent record of ensuring the facility's compliance with applicable safety and environmental federal, state, and local regulations. Besides supervising four research technicians, Mike works extensively with the researchers in preparing bid specifications and cost estimates for project contracts.

Mike has a "can do" approach as he oversees maintenance of all HTRI facilities, including our new building. His construction management experience proved especially valuable during the building of HTRI's new corporate headquarters. HTRI is extremely fortunate to have someone with Mike's extensive hands-on experience, knowledge, and commitment to quality.

Mike is married to Sarah; they have one son, Jake.

HTRI Software and Process Simulator Interfaces

HTRI works with process simulator vendors to provide interfaces with the engineering tools of our users. This article features interfaces with three popular products: Aspen Plus® from Aspen Technology, Inc., HYSYS™ from Hyprotech, and PRO/II® from Simulation Sciences Inc.

Aspen Plus®

With the release of Aspen Plus® Version 10.2, users can directly integrate IST 2.0 in the flowsheet. Aspen Plus® automatically calls IST for all HTRIIST heat exchanger “blocks” as part of the iterative solution. The IST installation directory includes a Microsoft® Word® document (Aspen.doc) that explains the straightforward procedure:

1. In IST 2.0, use the IST graphical user interface to create an IST input file containing the exchanger geometry.
2. Save the file as a .DAT file.
3. Start Aspen Plus®, and create and connect HTRIIST exchanger blocks in the flowsheet, entering the data file name defined in IST.

As the flowsheet converges, Aspen Plus® sends the process conditions, physical properties, and heat release curve to IST 2.0. IST calculates the exchanger’s performance, passing the heat duty and pressure drops back to Aspen Plus®. At the end of the flowsheet, IST 2.0 saves a complete .DAT file for every HTRIIST block. The file contains all geometry, process conditions, and physical properties. Previous versions of Aspen Plus® allowed only one-way transfer of simulation information to IST. The newest version permits a two-way exchange of information.

HYSYS™

Hyprotech provides an interface from HYSYS to IST 2.0. The HYSYS/HTRI interface utility, called HTRIFileGen, is a Visual Basic 4.0 file. Users can download it from the Hyprotech website at www.hyprotech.com/support/hysys/ole_2.asp

HTRIFileGen loads an existing simulation case. After an exchanger is selected, the interface runs HYSYS and creates the heat release curve and physical properties grid. If users save the information in a .DAT file, IST 2.0 can load the information and complete the exchanger design.

Further work is in progress for a more direct integration between HYSYS and HTRI *Xchanger* Suite.

PRO/II®

Simulation Sciences Inc. offers an Interface Module (P2HTRI) to automate the retrieval of data from a PRO/II database and to create an HTRI input file using these data. This module provides stream property profiles from PRO/II and transfers all existing mechanical and/or operational details of a specified heat exchanger from a PRO/II simulation to an HTRI input file. IST 2.0 can load the resulting .DAT file, and the user can then add any other information to complete the exchanger design or rating.

WE HAVE MOVED!

Please update your records:

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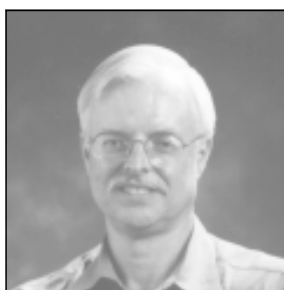
HTRI Board Elects New Officers

Following the 2000 Annual Meeting of Stockholders, the HTRI Board of Directors passed a resolution to limit the terms of the Chair and Vice Chair to four years. The Board elected William M. Boyle, The Dow Chemical Company, as the new Chair and Larry G. Hackemesser, Kellogg Brown & Root, as Vice Chair. Boyle was first elected to the Executive Committee in 1990 and to the Board of Directors in 1994. He had served as Vice Chair since 1999.

Hackemesser joined the Board in 1999.



W. M. Boyle



L. G. Hackemesser

G. E. Kluppel, Hudson Products Corporation, had served as Chair of the HTRI Board of Directors since 1993; he will continue as a Board member. He first joined the Executive Committee in 1991, becoming Chair in 1993. During the 2001 Annual Meeting of Stockholders, HTRI will recognize Kluppel for his service as Chair.

Board Member Retires

In January 2001, Albert E. Petras relinquished his seat on the HTRI Board of Directors because of his impending retirement from Aristech Chemical Corporation, where he held the position of Manager, Engineering Process Design. Al received his B.S. in Chemical Engineering from the University of Pittsburgh, Pennsylvania, USA, and has more than 30 years of experience in chemical processing, plant design, and applied research.



A. E. Petras

Since joining the HTRI Board of Directors in 1993, Al has actively contributed and generously shared his expertise. He has been a member of the Board of Directors' Audit Committee for the last six years, serving as Treasurer in 1999 and 2000. In addition, Al participated in the Strategic Planning Committee in 1995 and the Business Planning Session in 1997. We express our deepest gratitude for his many contributions and wish him well in his future activities.

HTRI Upcoming Meetings

2001 European Meeting

Barcelona, Spain
October 8-12, 2001
Hotel Meliá

Workshops Offered:

- *Xist* (October 10-11, 2001)
- Advanced Thermal Design of Reboilers (October 12, 2001)

2001 Asian Meetings

Yokohama, Japan
November 12-15, 2001
The Pan Pacific Hotel

Workshops Offered:

- *Xist* (November 13-14, 2001)
- Advanced Thermal Design of Reboilers (November 15, 2001)

Mumbai, India
Dates to be announced

Corporate News

Asian Office Operational January 2001

HTRI's second international office, this one in Chiba, Japan, opened in January 2001. The Asian office joins the European office in Guildford, Surrey, United Kingdom, to better serve our customers worldwide. Contact details of our international offices can be found in the back page of this newsletter.



H. Uozu

Our new Asian office is managed by Hirohisa Uozu, who has over 20 years of experience in heat exchanger design and the use of HTRI technology. Activities at this new office include general member services, marketing, and technical support, for companies in China, Japan, Korea, and Taiwan, ROC.

We encourage all our customers and interested prospective customers in these regions to take advantage of our local presence by working with our international offices when convenient.



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Engineering Foundation Conference

HTRI is participating in the organization of an Engineering Foundation Conference on heat exchanger fouling.

Promoting lateral thinking, systems approaches, and cooperation between researchers and/or industrialists, this conference will focus on fouling in petrochemical and food industries, as well as cooling water applications.

For detailed information about the conference, contact HTRI at EFC@HTRI.net.

**Heat Exchanger Fouling
Fundamental Approaches &
Technical Solutions**

**Davos, Switzerland
July 8-13, 2001**

IST 2.0 and the Windows® Registry

Microsoft® Windows® 95 introduced a new way to store application-specific data: the Windows registry. This feature records information about file locations, user customizations, and other operational information about your computer.

The Windows® registry appears in a hierarchical tree structure just like the directory structure on your hard drive. In fact, registry key locations look very similar to file paths or URLs in a web address. The keys themselves look like file directories (folders), while their defining values resemble documents. These values can be a string or a number depending upon the particular registry key. Modifying or adding the IST entry (key) to the Registry Editor lets you designate where IST 2.0 looks for data files and enhances IST's functionality.

Improperly editing or deleting registry keys can cause programs to fail. Check with your IT staff *before* you modify the Registry Editor.

Figure 1 shows IST's file location Windows registry entries. Most items are self-explanatory. For example, the value FluidFile points to the HTRI pure component databank. In this case, the string value is C:\HTRI\Shared\htriflud.bnk. Other values point to help files or other databanks that IST 2.0 uses.

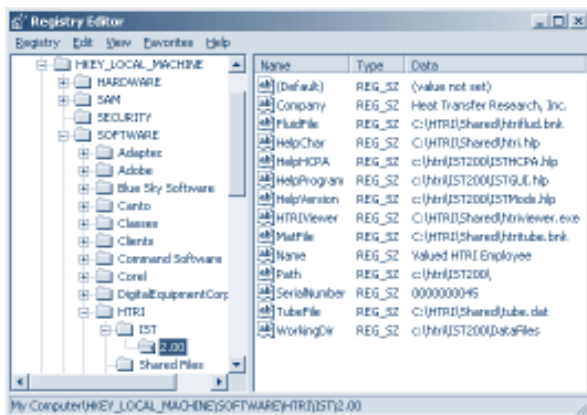


Figure 1. The Windows® registry and the IST 2.0 key

Two additional registry values extend the functionality of IST 2.0: DefaultsFile and DIPPRPath.

DefaultsFile Value

The DefaultsFile value specifies a file containing user-defined default values for the IST 2.0 interface. The DefaultsFile value should be set to a .DAT or an .HTRI file created using the IST 2.0 interface.

Once you specify the DefaultsFile value, the IST 2.0 interface automatically retrieves default values from that file. Anytime you create a new case in IST 2.0, the program loads the specified file. You can set default values for anything, up to and including an entire case with physical properties. By specifying a local or network file for the defaults file, you can set defaults on a company-wide or local user basis.

DIPPRPath Value

The DIPPRPath value specifies the location of the DIPPR pure component databank. With the DIPPRPath registry key specified, IST automatically uses the installed DIPPR files and allows designers to specify DIPPR databank components the same as HTRI databank components.

IST 2.0 supports Versions 12.4 and 13.5 of the DIPPR pure component databanks distributed by TDS (Technical Data Service).

Always check with your IT staff *before* you attempt to modify the Windows® registry.

Follow these simple procedures to modify the Windows® registry:

Opening the Registry Editor

1. **From the Start menu, select Run. Type regedit in the Open text field.**

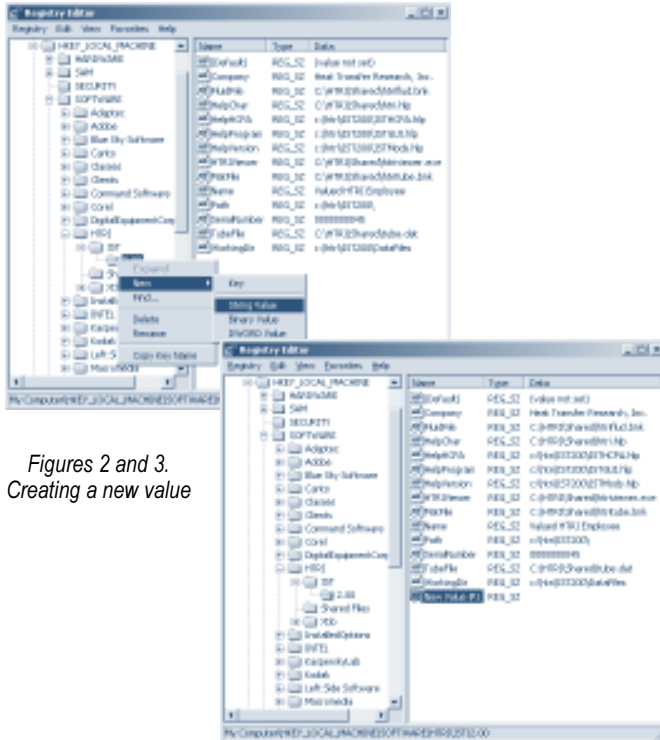
Modifying the IST 2.0 Key

2. Navigate to the HKEY_Local_Machine/Software/HTRI/IST key (folder).

Tech Tips

Adding, Renaming, and Defining a Value

3. Right-click the 2.00 key in the left pane of the registry window.
4. Select New | String value from the drop-down menu. The registry creates and highlights the new item



Figures 2 and 3. Creating a new value

5. Right-click the new item, select Rename, and type a name for the value.
6. Double-click the new value and enter the desired filename in the Edit String dialog box

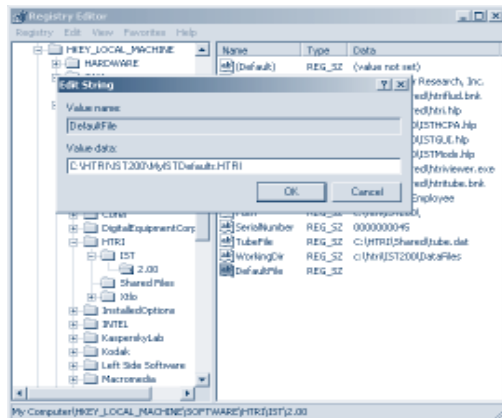


Figure 4. Defining the value

The Exchanger

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Information and registration forms are available at
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HTRI Focuses on Key Areas

Industry processes continue to change, energy conservation measures escalate, and heat transfer requirements become more stringent. HTRI intends to address these issues with methods to support new heat exchanger designs.

Increasingly energy-efficient plants will require that engineers provide more heat transfer from equipment. This challenge must be met by increasing heat transfer coefficients without increasing temperature difference and, because allowable space is limited, by maximizing the amount of heat transfer surface per unit volume, all without significant added cost or a decrease in safety and reliability.

These are not easy requirements, and they clearly call for concentrated, effective research with timely applicable results. Presently HTRI is pursuing these objectives along three parallel paths: enhanced shell-and-tube exchangers, compact exchangers, and fouling mitigation.

Enhanced Shell-and-Tube Exchangers

Combining new tube and/or baffle improvements with the rugged, reliable shell-and-tube construction provides more efficient heat transfer with minimum modification to the familiar design. HTRI has been involved in this effort for many years, testing a number of different tube and baffle variations. Recent condensation work has focused on using twisted tape inserts to increase tubeside heat transfer coefficient. Currently, we are installing a shellside condensation test section that will enable method development for the new super-dense fin configurations (up to 100 fins/in.) now being manufactured. We have completed a project on boiling inside horizontal plain tubes and are currently beginning research on twisted tape inserts. In addition, we conducted proprietary contract research for ABB Lummus Heat Transfer B.V. on its helical baffle exchanger (HELIXCHANGER™) and for Brown Fintube Company on its Twisted Tube™ designs. We expect enhanced shell-and-tube research to continue as additional variations are developed.

Compact Exchangers

Compact exchangers offer a number of advantages over shell-and-tube exchangers, but they have not been used as much in the hydrocarbon process industries. However, as requirements for more heat transfer with less temperature difference become more stringent, processors are re-examining the potential use of these exchangers for typical hydrocarbon process fluids. HTRI has been following these developments closely and already has in place a compact exchanger test unit (SPU). Report PHE-7 (2000) documented field experience with large welded-plate exchangers in reactor feed-effluent service. The next version of our plate exchanger software (*Xphe*) will include incremental calculations in preparation for the addition of a two-phase option. We plan to support plate exchanger boiling and condensing options with research on compact heat exchanger test sections to be designed for our Multipurpose Condensation Unit (MCU) and Multipurpose Boiling Unit (MBU). Our objective is to support design of compact heat exchangers as they become more widely used in the process industries.

Fouling Mitigation

Designers usually arbitrarily specify traditional fouling factors, a practice that can increase the surface area of the exchanger unnecessarily and thus drive up the cost. This inefficiency becomes critical when enhanced surfaces and compact heat exchangers are considered.

One of the biggest objections to using either has been the uncertainty regarding whether fouling would make newer type heat exchangers inoperable. It is, therefore, crucial to rethink how we handle design fouling allowances. Was a certain process fouling factor assigned in the past because true fouling was observed? Or was it assigned as a “safety” factor or for other reasons? We are screening fluids to determine their relative potential to foul, and thus obtain answers to these questions with reasonable certainty.

Technical Services

HTRI Develops Software for Member Company

Under contract to SGL ACOTEC, Inc., HTRI has developed software that rates, simulates, and designs the entire line of SGL graphite block exchangers. These exchangers are used in corrosive environments where normal exchanger materials cannot survive. The software developed by HTRI will become the standard tool for sizing graphite block exchangers within the SGL organization.

The SGL exchangers are manufactured in three configurations: cylindrical, cubical, and monoblock. An example of the cylindrical configuration with multiple blocks appears in Figure 1. All three types exhibit high heat transfer areas in compact volumes. The cylindrical and cubical designs allow stacking multiple blocks to achieve the desired heat transfer areas.

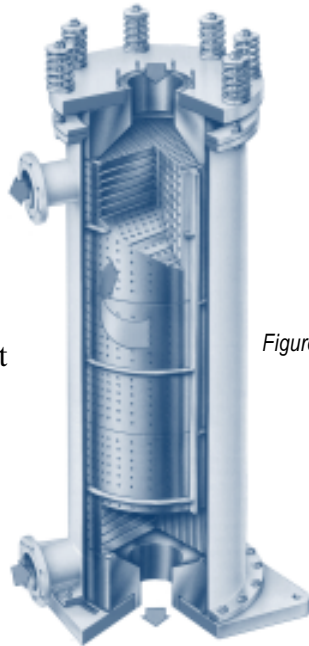


Figure 1

This new software, called BLK, consists of a Microsoft® Windows® graphical interface and calculation engine. The calculation engine is based on HTRI's proprietary tubeside heat transfer and pressure drop correlations.

The interface is similar to that of HTRI's IST 2.0. Using an existing interface significantly reduced development time, enabling concentration of effort on the calculation engine.

In the main input window of the BLK software (Figure 2), the user simply selects the type and model desired, and the program automatically loads all exchanger geometry. Process and physical property information is specified in exactly the same fashion as in IST 2.0.

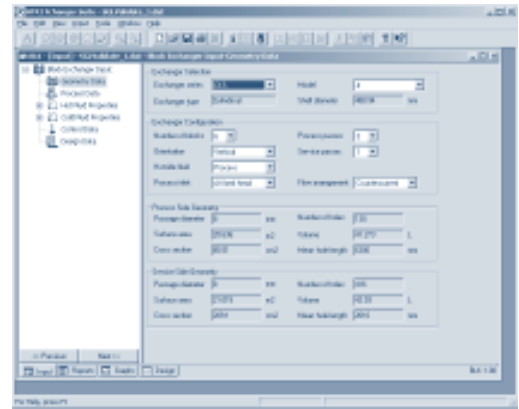


Figure 2

The software operates in rating, simulation, and design modes. In design mode, it automatically rates a user-specified grid of models, passes, and block numbers, and then selects the optimum design. Spreadsheet-style output reports (Figure 3) summarize the exchanger properties and performance.

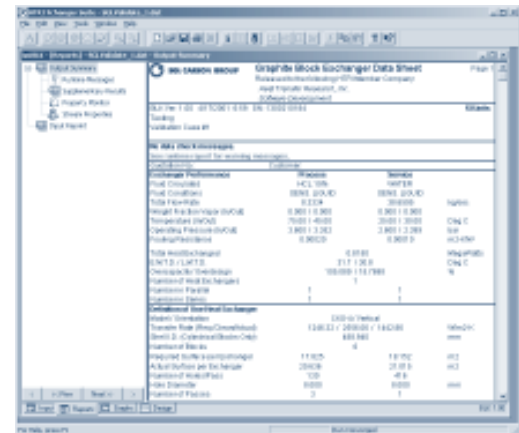


Figure 3

The BLK program is currently in final testing at SGL ACOTEC, Inc. and, once accepted, will be distributed throughout the company as the standard method of sizing the full line of graphite block exchangers.

To receive more information about HTRI contract software development, contact us at +1-979-690-3250 (fax), or Contracts@HTRI.net.

Technical Services

Training

Training Week – Houston was held at the Hyatt Regency Houston Airport, Houston, Texas, USA, February 12-15, 2001. Joseph W. Palen, Director of Research, conducted a new short course, *Introduction to Process Heat Exchangers*. In addition, Joseph W. Holmes, Manager of Software Projects, and Shawn McGee, Software Developer, presented the IST workshop.

Thirty participants, representing twenty-three companies, attended one or both sessions.

HTRI workshops offer our expertise in a classroom setting. Not only do attendees gain hands-on experience working through example calculations using the software, but they also have the opportunity for personal coaching from our experienced staff. These workshops provide background information on the research behind the software methodology.

HTRI training is offered at our regularly scheduled meetings or upon member request; visit our website at www.HTRI-net.com for a schedule of upcoming events. To arrange on-site training, contact us at Training@HTRI.net or +1-979-690-5050 (phone).



Two of the attendees at Training Week-Houston



TRAINING SCHEDULE

JULY 2001

EHT
Arlington, Virginia, USA

AUGUST 2001

Xist
Arlington, Virginia, USA

OCTOBER 2001

Xist
Barcelona, Spain

Advanced Thermal Design
of Reboilers
Barcelona, Spain

NOVEMBER 2001

Xist
Yokohama, Japan

Advanced Thermal Design
of Reboilers
Yokohama, Japan

For details visit the HTRI website -
www.HTRI-Net.com

Membership Update

November 2000 through April 2001

New Members

BASF Aktiengesellschaft

Ludwigshafen a. Rhein, Germany

Belleli Saudi Heavy Industries Ltd.

Jubail Industrial City, Saudi Arabia

Conoco Inc.

Ponca City, Oklahoma, USA

Duke Energy

Houston, Texas, USA

Formosa Heavy Industries Corporation

Hsiang, Kaohsiung County, Taiwan

Haldor Topsøe A/S

Lynghby, Denmark

Hering GmbH

Gunzenhausen, Germany

Seo Koatsu Kogyo Co., Ltd.

Osaka, Japan

SOFRESID

Paris, France

Tesoro West Coast Company

Anacortes, Washington, USA

New Participating Affiliates

ABB Lummus Global Pte Ltd

Singapore

Haldor Topsøe, Inc.

Orange, California, USA

Intecsa-Uhde Industrial, S.A.

Madrid, Spain

Jacobs Engineering Nederland B.V.

Leiden, The Netherlands

JGC Project Services Co., Ltd.

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Parsons Energy & Chemicals Group Inc.

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Struthers Heat Transfer UK

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Technip Abu Dhabi

Abu Dhabi, United Arab Emirates

Tranter Radiator Products, Inc.

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APEMA - Aparelhos, Peças e Máquinas Industriais Ltda.

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Pass it on!

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Current Software

ACE	3.2
FH	1.01
IST	2.0
PHE	2.0
ST Educational ...	1.1
VIB	1.0

Software distributed by HTRI

EHT	2.1
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To order an update for any HTRI computer program, contact Product Distribution.

Upcoming Events

Heat Exchange Engineering/ Eurochem 2001

June 5-7, 2001
Birmingham, United Kingdom

Engineering Foundation Conference Heat Exchanger Fouling

July 8-13, 2001
Davos, Switzerland

2001 Annual Meeting of Stockholders

July 30-August 3, 2001
The Ritz-Carlton® Pentagon City
Arlington, Virginia, USA

2001 European Meeting

October 8-12, 2001
Hotel Meliá Barcelona
Barcelona, Spain

INCHEM TOKYO 2001

November 6-9, 2001
Tokyo, Japan

2001 Asian Meetings

November 12-15, 2001
The Pan Pacific Hotel
Yokohama, Japan

Mumbai, India
To be announced

For training schedule, see page 13

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