

Hot News

from the heat transfer society



November 1997

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The President's Night

Reg Bott addressed us on the topic of *Fouling - the Final Frontier* at his well attended President's Night in October. He described fouling as the Cinderella of heat transfer technology and as a problem which was not easily tackled by applying hard and fast rules. He said that a more fuzzy-logic approach was necessary in order to do the best we could with the minimum of information on each unique problem.

All is not lost, however, because there are many sensible things which we can do at the design stage to make fouling less severe. This often means keeping velocities high, wall temperatures low and the concentrations of fouling precursors low. Unfortunately, all this care may be to no avail because of mistakes at the operating stage or unpredictable eventualities.

He concentrated much of his talk on biofouling in cooling water systems, a subject on which he is a world-renowned expert. Most problems are from bacteria, rather than algae and fungi, which simply love the ideal 30-40°C conveniently provided by the plant conditions.

Questions revealed that there is as yet no software which will sensibly predict fouling. Reg was pressed on whether there are some fluids/systems to which we should really assign a zero fouling resistance. While he accepted that there were such cases, as with the air side of air-cooled exchangers, he warned us to watch out for the cement works next door.

Many thanks

The *hts* is extremely grateful to *Boustead International Heaters Ltd* for their sponsorship of the President's Night.

New Members

We are pleased to welcome the following who have been accepted as *hts* Members during the last 12 months

Dave Hawker
Simon Davis
Tom Marshall
Dave Norton
John Osbourne
Rod McFarlane
Andrew Capel
Mervyn DeSouza
Brendan Hannan
Andrea Carattoni
John McCutchen
Brian Agnew
O Sucquart
J Mehta
Peter Turner

Target heat transfer people

For £250 companies and other organisations can include an insert in an *hts* mailing. The insert is then targeted at the 450 key heat transfer specialists in the industry. This is therefore an excellent way to advertise job vacancies and heat transfer events.

Contact: Dave Evans - Tel 01235 432323, fax 01235 831981

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The Future of your Society

The *hts* has been running successfully for 30 years evolving with the needs of its Members. The Committee has been reviewing the *hts* constitution to ensure that it still fulfils our needs. This has prompted us to ask whether we are still doing what members want.

Questions which spring to mind are

- Should we have more regional activities?
- Do you want more social events?
- Can we improve the Forum meetings?
- Is the information we send out clear and exciting enough?
- Would you use an *hts* web site if we created one?
- Should we take more major initiatives to promote the interests of our members?
- Should we become more international?

If you have any thoughts on these questions or any other useful ideas, send them to the Editor (contact details on back page) for forwarding to the Committee

Subscriptions

We have kept the annual subscription for the *hts* at the minuscule £7 for the last 10 years and arranged for you to obtain tax relief on this. Your side of the bargain is that you must actually pay your £7; not some lesser figure because you never get round to amending your standing order. Please, therefore, take note of the letter from the Honorary Treasurer which accompanies this *HotNews*.

Focus on Fouling

Following an initiative taken by the *hts*, a meeting entitled *Focus on Fouling - Profit From Best Practice*, was held at the Institute of Petroleum (IP) in London on 3 July. Support for the meeting was provided by *hts*, HTFS, IP, ETSU, Kvaerner John Brown and IChemE.

Nearly 60 people attended the meeting from UK, continental Europe and USA. The meeting was opened by Terry Lazenby, the Chief Engineer of BP and there were 10 presentations on topics which included designing out of fouling, retrofit to overcome fouling, cleaning, monitoring, maintenance and new research developments.

A theme running through all the presentations was that, while many fouling problems are too complex for a total solution, there are many sensible steps which can be taken to minimise or even prevent fouling. At a lively final discussion session, it was decided that we need a good practice guide which can address the full life of the exchanger from specification, through design, installation, operation, maintenance and ultimate replacement. Dave Butterworth and Bob Berryman of the *hts* are now looking for companies who would like to contribute to the development of such a guide. See the back page for the former's contact details

HEXAG

The Heat Exchanger Action Group (HEXAG) met at the University of Newcastle on 10 April 1997. The *hts* took this opportunity to hold a regional forum the night before hosted by the Department of Mechanical Engineering. See the report on this opposite - *Intense Times*.

Topics presented and discussed at HEXAG included compact evaporators, process integration, ALPEMA (Brazed Aluminium Plate-Fin Heat Exchanger Manufacturers' Association) and combined heat exchangers/reactors. The meeting included a tours of the laboratories led by Brian Agnew and Prof. Colin Ramshaw.

A report on the December HEXAG meeting will be included in the next Newsletter
For more information, contact David Reay, Tel 0191 251 2985, Fax: 0191 252 2229.

UK Heat Transfer Conference

The 5th UK National Heat Transfer Conference, supported by the *hts* was held in September at Imperial College London. The conference, attended by 119 delegates, comprised 8 invited special lectures and nearly 60 papers which were presented both by reviewers and in poster sessions. There were two industrial sessions on *Boilers and Condensers* and on *Compact Heat exchangers*. The UK conference holds its position as one of the most valuable for industry because of the combination of academic rigour and practical value. The 6th conference is planned for September 1999 at Heriot Watt University.

Forum Evenings

Intense times

We all like to think that the design of the heat exchangers is central to the operation of the plant. The truth is that the reactor or separation system is the lead player with the exchangers in a supporting role.

However, at the April regional forum in Newcastle, Prof. Colin Ramshaw from the University there, told us cases where, by combining the reactor with the exchanger, we could achieve orders of magnitude reductions in the plant size. One example is replacing huge furnaces with compact plate-fin type exchanges with catalytic coatings to achieve steam reforming on one side with methane combustion on the other.

Another innovation being developed in the department is heat and mass transfer on spinning disks, which gives thinner films than would be achieved by gravity thinning alone.

When the pressure is on

John McCutchen, came over from Yuba in the US to tell us why the combination of high pressure and thermal cycling presents difficult mechanical design problems. The high pressure leads to thick components which do not accommodate the temperature changes well.

Yuba have come to grips with this problem by using advanced finite element analysis to evaluate the likely stress levels during the transient and hence refine their designs to limit the worse problems. Their technology, originally developed for feedwater heaters is also of great value in many process applications.

The high point of the presentation were computer animations of the simulated stress levels during a thermal transient.

Don't be phased

In May, Professor Barry Azzopardi from Nottingham University entertained us with stories of the capriciousness of gas/liquid two-phase flows. He gave the example of splitting such flows in a T-junction. Phenomena such as

flooding and hydraulic jumps cause the flow to behave in an unpredictable and sometimes counter-intuitive manner. Worse, there could be strong hysteresis effects so that there are two stable operating conditions depending on the direction from which the flow conditions are approached.

Despite this, Barry was confident that he would be able to give answers to some of the problems as our detailed knowledge of such flows increased.

Foul deeds

In June, using the Bauxite industry as an example Hans Müller Steinhagen showed how collaboration between industry and university has developed successful strategies for mitigating fouling. The Forum was held at University of Surrey in Guildford where Hans is a professor.

Fouling is one of the major problems in producing Al_2O_3 from bauxite during the Bayer process. Some exchangers may only operate for 5 days before they need cleaning. Modelling of the fouling process itself and the heat exchanger system has proved extremely valuable in optimising the operating/maintenance cycle.

The mechanics of the problem

At our September Forum, Peter Young of Schell Software & Engineering and Tim Griffin of HTFS described the new era in mechanical design of shell-and-tube exchangers.

Gone are the days of laborious transfer of information between thermal and mechanical software. This is now fully automatic enabling the mechanical design to be done straight from the thermal, and then for the thermal design to be rechecked following changes made at the mechanical stage.

All this is done with object-oriented, Windows software capable of generating 2D and 3D drawings.

<p>The November Forum will be reviewed in the next Newsletter. This was given by Kenny Graham of Torch Quality Services and was on the inspection of heat exchanger tubing.</p>

Heat Exchange Engineering

The *hts* will be supporting the next Heat Exchange Engineering conference and exhibition which will be held at the NEC Birmingham, 2-4 June, 1998, in conjunction with the Eurochem Show. The conference will cover heat transfer in relation to the environment, process optimisation and fouling.

For further information, contact Bob Berryman, TTM, Tel/Fax 01235 767 579

Waste Heat

by L M Teedy

What's the use

I found myself recently at a meeting of the UK Committee for Heat Transfer where we were reviewing the abstracts of papers submitted to the next International Heat Transfer Conference in Korea. I suggested that one particular abstract should be rejected on the grounds that it was of no conceivable use to anyone ever. There was stunned silence from the rest of the committee after which I was told "If we rejected useless papers, we would have hardly any left". More power to the *hts* with our efforts to further the new useful developments in heat transfer technology.

Practical heat transfer

Talking of practical heat transfer problems, as I sit and type this, the cold creeps into my bones and I hear the central heating engineer, on his third visit, muttering that it must be the control on the boiler. He has just decided to give up and get an electrician in to check all the wiring. He departs with a cheery "I'll see you later". I can't help wondering why my long heat transfer experience gives me no advantage whatsoever in diagnosing my own central heating.

Up in the clouds

I was amongst nearly 80 heat transfer experts who spent a week in at 7000 feet in the ski resort of Snowbird near Salt Lake City in Utah. We were supposed to be discussing compact heat exchangers and, despite the attractiveness of the location, we did indeed have many discussions and listened to many presentations on all types of compact heat exchangers. Apart from the occasional trip in the cable car which took us up to 11,000 feet we were able to keep

our feet firmly on the ground when discussing the advantages and disadvantages of compact exchangers.

Clearly, most the attendees were from the US. I was most fascinated by how much the US delegates looked towards Europe and the UK for expertise on compact exchangers. The general feeling was that the Europe was way ahead of the US on the successful use of compact exchangers in process plant. It is also noticeable that most the major manufacturers of compact exchanger are European based. This is all the more surprising when one sees how the US tends to dominate the engineering side of the heat transfer business.

Beyond the clouds

A new breakthrough in HOTOL (horizontal take off and landing space craft) has just been announced. The break through is made possible by a new type of heat exchanger. It brings tears to your eyes!

The views of L M Teedy are not necessarily those of the *hts*.

Future Events

- *London Forum, 13 January, 1998, "Latest developments in printed circuit heat exchangers", Andrew Hills, Heatric Ltd*
- *London Forum, 10 February, 1998, "The new European pressure equipment directive and its affect on the heat exchanger industry" Malcolm Hynd, DTI**
- *Annual General Meeting, London, 3 March, 1998*
- *Annual Dinner, London, 27 March, 1998*
- *London Forum, 21 April, 1998, "Latest developments in plate-fin heat exchangers", Presenter from IMI Marston*

*Note change of date

The next *HotNews* will be printed in April 1998
Contributions are needed by mid March, which should be sent to

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