

HotNews

from the heat transfer society



September, 2000

Issue 2000/1

President to Start the New Millennium



The President, Geoff Hewitt, shown here with the Society's "worry balls" which he holds for the duration of his presidency!

The *hts* wanted to mark the New Millennium by having a very special President. It didn't take us long to choose Geoff Hewitt even though this set something of a precedent because it is our tradition not to have the same President for more than one year and Geoff had held this post in 1977. It is a tribute therefore to Geoff's great eminence in heat transfer that we ignored the tradition for this special year.

After obtaining his PhD at UMIST, Geoff started a long research career at Harwell where he made many discoveries that have changed our views of two-phase flow and boiling heat transfer. While at Harwell, he founded the Heat Transfer and Fluid Flow Service, HTFS.

In 1985 he became a part time professor of chemical engineering at Imperial College while continuing his work as a division head at Harwell. He became a full-time professor in 1990. Although now having reached retirement age, he continues a busy research programme as an emeritus professor.

There is not space here to list all Geoff's honours but he is both a Fellow of the Royal Society and of the Royal Academy of Engineering. He was President of the Institution of Chemical Engineers in 1989. His many heat transfer awards include the D Q Kern Award (from AIChE), Max Jacob Award (ASME) and Luikov Medal (International Centre for Heat & Mass Transfer). He has honorary doctorates from two universities and has authored and co-authored several books.

Geoff has a great love of music and beginning to find time in his busy life to for the visual arts.

The Annual Dinner

The dinner on 31 March was a great success again this year thanks to the efforts of Colin Weil, the *hts* committee member who takes on the task of organising the event each year. The dinner was attended by about 160.

Geoff Hewitt was inaugurated as President for the year. Richard Jibb received the Mike Ackrill Trophy (see page 3 for details). Ron Cowie was made a Life Member of the Society and Geoffrey Walter made a Fellow of the Society.

The guest speaker Lee Wilson, who is a professional after-dinner speaker, entertained us with many pointed comments and jokes about life in the West Midlands.

Raffle prizes were donated by HTFS and Motherwell Bridge. The raffle raised nearly £500 for Macmillan Cancer Relief.

Target heat transfer people

For £250 you can include an insert in an *hts* mailing. The insert is then targeted at the 500 key heat transfer specialists. This is therefore an excellent way to advertise job vacancies and heat transfer events.

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Forum Evenings

Making a clean break

At the November 1999 forum, Colin Weil gave an overview on a joint industry project to evaluate design methods for a shell-and-tube heat exchangers that contains high pressure gas in the tubes and cooling water in the shell. In such services the designer must consider the risk of tube failure. The research was undertaken by the Health and Safety Executive in collaboration with Sheffield University.

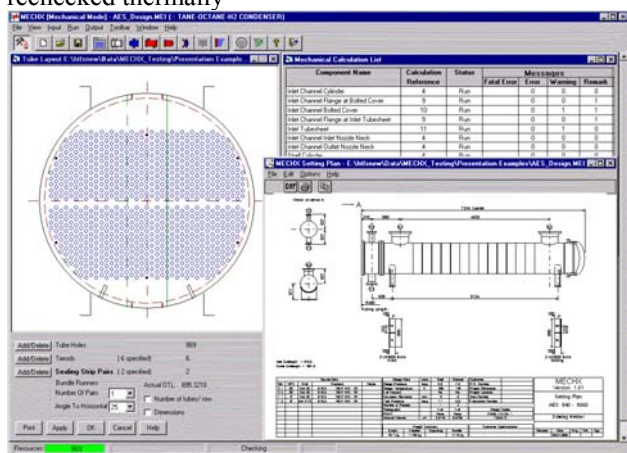
New experimental data from a full-scale test had been compared with the predictions of commercial dynamic simulation programs. The profiles generated had good correlation with pressure growth and decay. However the actual pressures calculated were heavily dependent on the choice of variables used in the simulations. In particular the speed for the bursting disc to fail to full bore was found to be critical.

He warned that even if the shell withstood the pressures generated from a tube failure, there was a very severe pressure transient created by the slug of water expelled into both the relief line and the water inlet and outlet piping. Care was therefore required in designing the piping to withstand the forces generated by these slugs.

This report was held over from the last newsletter.

Joined-up engineering

At the January Forum, Tim Griffin, of HTFS, with support from Dave Evans, showed the advantages that can be gained from combining thermal and mechanical aspects of the design of a shell-and-tube exchanger. They illustrated this by going through the steps in the design of a feed water heater with high pressure on the shell side. The high pressure introduced complexities in the mechanical design that could not easily be anticipated at the thermal stage. Hence, it was necessary to make major changes at the mechanical stage, which had to be rechecked thermally.



MECHX, shown here was used to illustrate the talk.

Tim used his presentation to prompt discussion on the pros and cons of integrated design teams. He stated

that the design of an exchanger usually involved a process engineer, a thermal designer, a mechanical designer and a salesman, and could also involve three companies. While barriers between these groups were recognised, members of the audience suggested that the task-force approach was sometimes very successful in breaking down the barriers. It was also noted that many companies now combined two activities like thermal and mechanical design but there were good reasons for not combining more.

For more information - www.software.aeat.com.

What's new in TEMA?

That bible for shell-and-tube designers, the TEMA Standards, is now revised every ten years. The 1998 edition came out last year, just slightly late. In the February Forum, George Bowes saved us all that tedious job of trying to figure out what is new and different in the latest edition by outlining the key changes. The new features he mentioned were

- Design of floating head split rings
- Design of double tube sheets
- Modifications to the design of flexible shell elements (expansion joints)
- Two-phase flow added to vibration section
- Information on the design of supports, lifting lugs and the reaction on foundations

The good news is that TEMA is now beginning to recognise the existence of metric units but the bad news is that the fouling -factor tables remain the same.



For more information - www.tema.org

Hot under the collar

At the April Forum, John Sandalls gave a talk on the two separate subjects of global warming and the depletion of the ozone layer.

John went through the standard arguments that man-made greenhouse gases have the potential to cause significant global warming. He also reviewed the scattered evidence that such global warming now appears to be starting. When challenged that the evidence is not overwhelming, John countered by saying that it would in any case be beneficial to reduce the output of greenhouse gases now especially since it will be too late when we have incontrovertible evidence.

Predictions based on current trends suggest that by 2050 Manchester will be as warm as Oxford is today, and by 2100 much of Florida, London, Northern France and Bangladesh will be under water.

The depletion in the ozone layer is quite a different problem. This tenuous layer of 8 ppm of ozone which is

20-35 km above the earth is considered to remove 99% of the sun's harmful radiation. The problem is that minute quantities of halocarbons can seriously deplete this layer since one chlorine atom can destroy thousands of ozone molecules.



John Sandalls

Breaking the mould

At the May forum, Terry Winnington of *Process Kinetics* gave a thought provoking talk suggesting that there are many chemical-engineering processes which can be transformed radically using new ideas of process intensification. He gave a brief history of the use of rotating equipment to enhance heat and mass transfer processes including achieving better-controlled chemical reactions. This technology could often replace large batch plants with small continuous ones.

The problem presented by all this is that the design methods have to be developed from scratch. Furthermore, some of the cherished theories of mass transfer are pushed to and beyond the limits of their applicability.

Another, perhaps worse, problem is to convince industry that this new approach works and is economic.

For more information - www.processkinetics.com

Heat electric

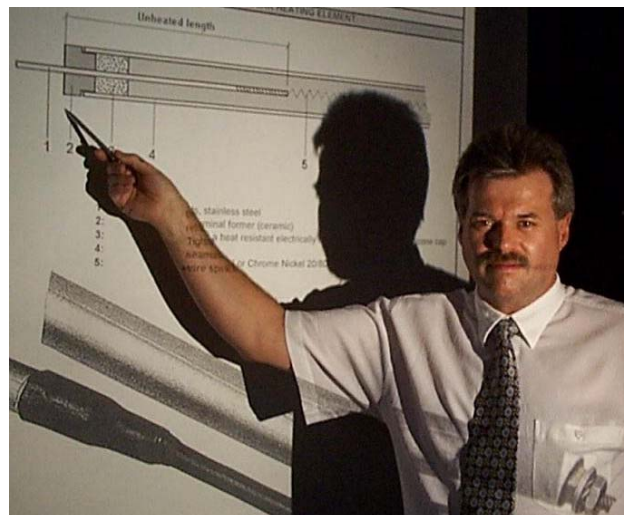
At the June forum, John van Ravenswaaij of *Sinus Bobé* told us about the design and construction of electric heaters for process applications, and their developments over the last 15 years.

The main thrust over this period has been to increase the power rating on the heaters in order to compete with conventional heat exchangers as well as reducing the exchanger weight for off-shore applications. Heaters were once rated for only 1 to 2.5 W/cm² but now 7 W/cm² is common.

Clearly, the higher ratings require better manufacturing standards and also more accurate calculation methods to ensure that the element does not exceed the maximum design temperature, which is in the region of 200°C. Furthermore, there have been improvements in control of the power to heaters.

Another important development has been the availability of high alloys (incoloy, inconel) for sheaths to extend the range of applications.

For more information email info@sinusbobe.com



John van Ravenswaaij

Mike Ackrill Award

The Mike Ackrill Award is given for the best presentation at an *hts* Forum. The criteria are that the presentation

- Contains information of significant value to a sector of the heat-transfer industry especially if of topical interest
- Contains information which may be counted towards Continuing Professional Development (CPD) rather than simply being an advert for the companies products or services
- Is clearly and logically presented

The prize was awarded this year to Richard Jibb for his presentation at the November 1999 Forum entitled "Reflux condensation - integrating heat transfer and separation". This described work done by Richard while working for his engineering doctorate under the joint industry/university EngD scheme. In this case the partnership was between UMIST and Cal Gavin. There was a report on this Forum in the last *HotNews*.



Richard Jibb receives the Mike Ackrill trophy from the President

The AGM

At the AGM on 2 March, Simon Earland announced his decision to step down as the Society Chairman, a job which he has done with great skill and diligence for many years. George Bowes of Wellman-Graham was elected to take over Simon's role. Simon was elected to remain on the committee where he can continue to give us the benefit of his knowledge and experience on *hts* matters. David Jones and Graham Polley stepped down as committee members and were thanked for their work over the years. Peter Caldicott was elected as a new member of the committee and the other officers and committee members were re-elected.

The current *hts* Committee

George Bowes (Chairman)	Peter Caldicott
Colin Weil (Secretary)	Simon Earland
Dave Evans (Treasurer)	Martin Gough
Kassim Bacchus	David Norton
Bob Berryman	Nigel Smith
Dave Butterworth	Tony Terranova



*Simon Earland (l) congratulates George Bowes on his election as *hts* Chairman*

UK Heat Transfer Conference 2001

Make a note in your diary that the next UK National Heat Transfer conference will be held at Nottingham University on 11-12 September 2001. As in past years, this event will cover all aspects of heat transfer but his time will concentrate on the heat transfer aspects of sustainability, process intensification and reliability. The call for paper will be circulated in shortly. Information is already available on the conference web site

www.heat-transfer.org.uk

Emailing service

In order both to save money and to provide a better service to *hts* members, we are investigating the possibility of sending forum notices and Newsletters out as email attachments to those who prefer this method of receiving information. A questionnaire on this is included with this Newsletter. Please take a look at this and respond.

New web-site service

Companies, consultancies and other organisations will be able, for a small fee, to include information on their products and services on the *hts* web site. This will be a useful service for the industry as well as giving the *hts* income to offset the costs of providing the site.

Waste Heat

by L M Teedy

Expert systems

I was invited to make a presentation on expert systems at a round table discussion meeting at the last US National Heat Transfer Conference.

After listening to several grandiose (vapourware) schemes for organising heat transfer design, I was forced to point out a few facts. The basic rules of "artificial intelligence" were first thought out by the ancient Greeks in an attempt to codify logical argument. The concept of a machine that could handle such rules has been around since Babbage proposed his analytical engine. Hence, in the 1960s, we could imagine putting these concepts together to create a machine like Hal in the film 2001. Well, 2001 is only one year off and the very best "expert systems" have about the IQ of a snail.

I therefore proposed that we should forget our grandiose schemes and concentrate on designing software that lays out all the results of calculations, along with well devised checks and warning messages, in such a way that the designer can apply all his IQ and lateral thinking to producing superb designs.

Cooling electronic equipment

At this same conference, I counted five times as many papers on the cooling of electronic equipment than on process heat transfer. I guess I am typical of many in the *hts* whose background and experience is on the process side. I am beginning to think I should make a change before I am too old, although my wife wastes no time in telling me that I already am too old.

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

Future Events

- *The President's Night, London, Tuesday, 24 October*
- *London Forum, Thursday 16 November, "Flow-induced vibration", Hugh Goyder, Cranfield University*
- *London Forum, Thursday 11 January 2001*
- *London Forum, Tuesday 13 February 2001*
- *AGM, London, 1 March, 2000*

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