

SGT NEWS



Compiled and
published by
Argus
Business
Media Ltd on
behalf of the
Society of
Glass
Technology

NORTH AMERICAN SECTION ANNUAL MEETING

by *Alix Clare*

The 1996 annual meeting of the North American Section was held at the Radisson Suite on Sand Key, Clearwater, Florida, on 17 and 18 January 1997. The event was held in conjunction with the Center for Glass Research at Alfred University and consisted of an afternoon session, followed by a plant trip the following morning. One session on surface characterisation and treatment was sponsored by the CGR, while the Society of Glass Technology sponsored a second, on issues surrounding oxy-fuel firing.

The SGT-sponsored session included a talk by Steve Winder, from Monofrax, on refractory selection for oxy-fuel furnaces. A proprietary corrosion test has been developed which allows quantitative comparison of superstructure refractory performance under different combustion conditions. For most glass types, the optimum furnace crown refractories for an oxy-fuel furnace were fused cast alumina.

BOC's Andrew Richardson gave a presentation on burners and combustion and chemical kinetics and the flame chemistry involved. Ray Richards from Associated Technical Consultants introduced ideas on how to get the most from oxy-fuel firing with some burner configurations.

Regeneration for oxy-fuel furnaces was the subject discussed by Ron Argent of Frazier-Simplex. The process involves the creation of

synthetic air by exhaust gas regeneration and addition of oxygen. The regenerators act as a filter for particulate and condensate and can potentially eliminate the need for electrostatic precipitators. As much as 20%-30% energy can be saved in comparison with oxy-fuel firing without regeneration.

ANNUAL DINNER

The section's annual dinner was held at the Columbia Restaurant and an after dinner talk was given by Jack Wenzel, the inaugural North American Section Chair, about his experiences as a Fulbright scholar in Mexico.

PLANT VISIT

Specialty Glass is a small glass plant in Oldsmar, Florida which manufactures glasses for a number of applications including the sealing of electronics and antifungal devices for telephone poles. The North American section is grateful to Specialty Glass for making visitors welcome and for providing such an interesting afternoon.

1997 ANNUAL MEETING

The section's next event will be the 1997 Annual Meeting, which has been organised to coincide with the 52nd annual Ceramics Forum, at Pennsylvania State University, in September 1997. A plant visit to Corning's Television glass factory at State College is also planned. ■



WEB SITE

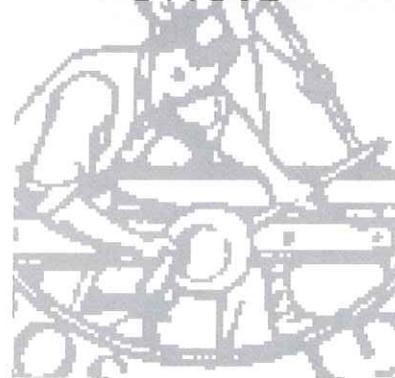
The Society of Glass Technology can be found on the worldwide web (<http://www.sgt.org>). Anyone with access to the internet can obtain up to date information on Society meetings, publications and local section events. The site is hosted on the British Glass web server which means it can maintain a high profile on the Internet. Links with other institutions and organisations are presently being established and the service will continue to grow throughout the year.

The site currently holds information on the Society's publications, forthcoming meetings, membership, local section events, the annual report and technical committee details. Abstracts of papers published by the Society during 1996 up to the current issue provide information and a useful survey for members who only subscribe to Glass Technology or Physics and Chemistry of Glasses.

ELEVENTH ANNUAL SYMPOSIUM ON NON- OXIDE GLASSES

The 11th annual symposium on non-oxide glasses will be held from Monday 7 to Thursday 10 September 1998 at Tapton Hall of Residence, University of Sheffield. The meeting attracts around 100 delegates who discuss new and innovative glasses, their synthesis, applications, electro-optical properties, rare earth doping and structure. Dr Angela Seddon, of the Centre for Glass Research at the University of Sheffield is to chair the conference.

AUTOMATIC GLASS CONTAINER INSPECTION EQUIPMENT



In recent years, automatic inspection systems at the cold end of glass container factories have played an increasingly important role in improving the quality of the finished product. The continued development of the technology supporting these inspection systems is providing added opportunities to improve inspection performance. The Yorkshire Section recently invited representatives of four of the major suppliers of automatic inspection systems to Beatson Clark's Rotherham site to answer questions on the subject. The panel consisted of Mike Curry, technical director at BWI Inex, David Pugh, representative of SGCC in North Europe, Jean-Luc Logel, worldwide sales representative of MSC and Eric Skelton, sales and service manager, Emhart Powers. The session was chaired by Ian Robertson of Hepworth. Issues discussed included vision-based check detection, colour capability differentiation and self-taught inspection machines.

Maintaining both a high quality and a high volume of production is paramount in assuring the main customers of the container industry that inspection equipment is performing to the highest standard. Efficiency can be proved by

demonstrating that quality control data matches hot end and statistical process control data. The development of hot end inspection will enable manufacturers to deal with cavity related faults more effectively but, as yet, the technology is still in its infancy. Physically, there are space limitations for many multi-camera, hot end inspection systems which can be difficult to resolve in established factories.

Vision-based check detection is an area of development that all represented suppliers are working on. All have operable systems but they are not yet ready to be introduced into the market. The implementation of fully reliable systems is unlikely to take place for another five years but the last few years have seen a great deal of activity in this area.

The panel of suppliers also discussed the fact that the development of colour differentiation capability, combined with mould number readers could now enable a readout to be produced which would identify and categorise persistent sources of faults. Multi-processor boards, which are currently being introduced to the market, represent one form of affordable technology for processing the volume of data from such measurements.

Although the development of artificial intelligence and fuzzy logic is still in the early stages, it is believed that it will eventually be possible to introduce a self-taught inspection machine. The machine would be able to identify any faults and then convey a message to the hot end to remove those faults. In the short term, the equipment necessary would not greatly differ from that currently in use. However, the development of more complex machinery would need to be reconciled with the need for simplicity of operation.

Increased line speeds, light-weighting and job mix were all discussed. A major difficulty for inspection equipment is dealing with non-round containers. However the development of inspection machinery appears to be keeping pace with other glass production technologies. ■



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REACTIONS AT GLASS SURFACES

The SGT and the Applied Solid State Chemistry Group of the Royal Society of Chemistry are holding a joint one-day meeting on reactions at glass surfaces, on 29 October 1997 at the Pilkington Technology Centre, Lathom. The meeting will cover the broad topic areas of analysis at glass surfaces, together with coating growth processes. Guest speakers will give presentations which will deal with surface reactions on glass, reviews of state of the art glass/coating interface analysis techniques and the future capabilities of computer modelling of these interfaces.

Key speakers include: Professor N Greaves (Aberystwyth University); Dr D Holland (Warwick University); Dr D Chappell (Pilkington Group Research); Dr Liz Colburn (Oxford

University); Professor M Pemble (Salford University); Dr S Irving (NEWI); and Dr I Parkin (University College, London).

Facilities for poster presentations will also be available at the meeting and posters are currently being sought. The papers and posters will be published in a special proceedings volume as part of the Topical Issues in Glass series. Anyone interested in presenting a poster or attending the meeting should contact Jill Costello at the Society for further details.

GLASS IN ELECTRONICS

The two day meeting on glasses and their uses in electronics has been postponed to a date to be announced in 1998. The venue, Warwick University, will remain the same.

INDIAN SECTION

Chandra Kumar Somany has taken over as chairman of the Indian Section, from Sushil Jhunjhunwala.

Mr Somany is the managing director of Hindustan National Glass and Industries, and Glass Equipment India. He is responsible for the overall management of an important container glass producer in India. Mr Somany has served as president of the Merchant Chamber of Commerce, the All India Glass Manufacturers' Association and the Bengal Glass Manufacturers Association. He has contributed significantly to the formulation of the Indian Standards Specifications, both as chairman of the glass panel on Holloware, and as a member of the Indian Bureau of Standards' Chemical Division.

Mr Somany said in his brief address that the Society of Glass Technology was making an enormous contribution to the growth of glass science and technology throughout the world. He made an appeal for people to become members of the SGT through the Indian Section and to participate in seminars. It is only through discussion and the exchange of technical knowledge that the glass industry in India can grow.

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FORMING CLINIC EXAMINES NNPB

by Dr P F Hart

The Society's Engineering Committee held a clinic meeting at Keresforth Hall in March on the subject of narrow neck press and blow (NNPB). It was organised for glassmakers to discuss informally problems experienced in NNPB manufacture and to cross fertilise ideas for solutions. About 30 members attended and Mr D Annetts took the chair.

The meeting opened with a discussion of the most common problem, which was agreed to be black specks. It was suggested that the specks were metallic in origin and arose from wear of parts, particularly plungers and positioning parts such as neck rings. Hardened collets could reduce wear but emphasis was on good alignment to prevent relative movement. Precise alignment is also necessary to reduce friction, with the objective of pressing at low pressure and high gob temperature.

The results of an analysis of the black specks, carried out by British Glass some time ago, were brought up. Tests had found the specks to be generally carbonaceous rather than metallic.

The relative merits of collet adaptors and screw-on plungers were discussed, with both systems being used. Screw-on plungers are standard on the Emhart set up but adaptors, as used in the Heye design, were more common, being easier to remove and hence giving shorter changeover times. One potential problem with collets is the possibility of their restricting air flow to the plunger.

Other problems covered included the possibility of internal oxidation of the plunger causing hot spots. Alternatives to cast iron, such as Stellite, are available but close attention has to be paid to matching thermal expansion co-efficients. Plunger wall thickness and profile modifications for efficient and even pressing and cooling were discussed and the importance of cooling tube design was emphasised. These designs have evolved from a single, straight

tube, to a profile matching the plunger with angled side holes. Guidelines on this subject have been published by British Glass.

Faults arising from the neck ring are critical in NNPB. Alternative materials such as Monox (aluminium bronze) can be used to improve cooling at high speeds. If it is used, however, design adjustments are necessary due to the different expansion co-efficients involved, to ensure tight control of all clearances. These materials also have the potential to 'grow' with time. Neck ring faults can also be caused by overpressing due to weight variation.

IS NNPB THE WAY FORWARD?

The question 'is NNPB the way forward?' was asked. Although the technique has allowed the manufacture of lighter containers at higher speeds, it was also argued that blow and blow could be as effective as NNPB if the same standards of control and maintenance were applied. It was known that trials of improved and modified blow and blow were in hand by a number of companies.

Plunger mechanisms were discussed and particularly the use of narrower piston cylinders in order to operate at lower pressures with better control. This was more relevant as NNPB technology moved on to larger centre machines. The control of plunger pressure and the speed of movement of the plunger were critical and it was suggested that eventually hydraulics might prove superior to pneumatics.

Lubrication of plungers is essential and the differences

between synthetic oils, which result in less carbonisation, and mineral oils were reviewed. Surface finishes and surface treatments were discussed. It was noted that polishing, often required for new equipment, was expensive and was not usually repeated in-house. Vertical honing, which leaves any marks in line with the pressing action, was as effective.

Surface treatments, coatings or surface modifications were being studied for their application on both cavities and plungers to reduce wear and loss of hardness at temperature. Methods discussed included nitriding and deposition of nickel and tungsten-based coatings.

British Glass has initiated a new project covering plunger materials and cooling tube design. Computer modelling is being included to allow evaluation of new designs.

There was general agreement that the current generation of forehearth and feeders gave adequate control of temperature and gob weight for flint glass, albeit by differing techniques. Early results suggested that the modern cascade bowl designs gave greater gob stability and more even wear. Current systems are giving glassmakers variations of $\pm 1.5g$ on a 400g container, with weight control following feedback from sensors measuring plunger penetration. With coloured glasses, problems with blister and a lower level of temperature homogeneity were identified.

Graphite materials were still most common for hot glass handling. However the selection of the correct grade was identified as necessary to prevent problems, alignment was also important. The meeting concluded with a discussion of set-up techniques. ■



LOCAL SECTION CONTACTS

For details of forthcoming local section events in your area, contact the following. All SGT members and non-members welcome.

London

– Mr P West, United Glass Ltd, Porters Wood, St Albans, Herts AL3 6NY. Tel 01727 59261.

Midlands

– Mr C Baldwin, Stein Atkinson Sturdy Ltd, Midland House, Ounsdale Road, Wombourne, Near Wolverhampton WV5 8BY. Tel 01902 324000.

North East

– Mr J Henderson, 44 Woodside Ave, Throckley, Newcastle upon Tyne NE15 9BE. Tel 0191 264 4775.

North West

– Dr D Martlew, Pilkington Technology Centre, Hall Lane, Latbom, Ormskirk, Lancs. Tel 01695 54210.

Scottish

– Mr D A Rennie, United Glass Ltd, Glasshouse Loan, Alloa FK20 1PD. Tel 01259 218822.

Yorkshire

– Miss R M Sales, 20 Blackbrook Drive, Sheffield S10 4LS. Tel 0114 2306179.

North America

– Dr A G Clare, School of Ceramic Engineering and Sciences, New York State College of Ceramics at Alfred University, 2 Pine Street, Alfred, NY 4802-1296, USA. Tel 607 871 2392.

India

– Dr J Mukerji, Central Glass and Ceramic Research Institute, PO Jadavpur University, Calcutta 777 032, India. Tel 473 3496.

THE PROPERTIES OF GLASS

by Dr P F Hart

A joint meeting of the Society of Glass Technology and the Glass Association held on 5 April at the Turner Museum, University of Sheffield and the Mappin Museum and Art Gallery, was attended by about 65 members of the two organisations. It was opened by Janet Barnes, Honourary Curator of the Turner Museum, who outlined the history of Professor W E S Turner, including the establishment of the first university department set up to study the science and technology of glassmaking and the history of the Society of Glass Technology.

Those attending were shown the museum's glass collection, the core of which was established by Professor Turner in the 1920s and 1930s. It includes an eclectic mix of pieces selected for their technical interest and for aesthetic qualities that appealed to Turner. Originally the museum was at the centre of the department. It was moved to its current home in 1993 when the glass technology department relocated from its original home at Elmefield to the Department of Engineering Materials.

The collection is not exhaustive but essentially personal to Professor Turner. The provenance of the pieces is generally well established but the value and significance of the collection was not well understood until the 1980s. Only the much larger collection at the Victoria and Albert Museum in London is comparable.

The museum is particularly strong on 20th century glass, with significant examples by Frederick Carder of Steuben Glass, Scandinavian glass from the 1930s design developments and the British studio movement of the 1970s and 1980s. It also includes a collection of 18th century drinking glasses donated by Albert Harland, a local MP, in 1943.

From the Turner Museum, the meeting moved to the Mappin Gallery where, following introductions by Jill Costello, from the Society and John Brooks of the Glass Association, three members of the Society spoke on various facets of glassmaking. All three are to be complimented on avoiding both excessive academic technicality and undue simplicity.



Janet Barnes holds the blue fibre glass wedding dress worn by Helen Nairn Monro on her marriage to Professor W E S Turner on 1 July 1943. The material was free of rationing coupons!

EVOLUTION OF GLASSMAKING

Professor Cable of the University of Sheffield, introduced the meeting to the chemistry of glasses, basing his talk on the modifications to silica required to achieve the key objectives of acceptable properties for making glass, explaining the viscosity/temperature curve, and for its subsequent survival and chemical durability. He explained how combinations of just six main chemicals, together with a few additives to provide colour or assist melting, can be used to achieve a vast array of glasses with optical, electrical and other properties almost made to measure. He also described the historical development of glassmaking techniques.

COLOUR IN GLASSES

Peter Howard, a consultant specialising in small scale glass production and coloured glasses spoke on the phenomenon of colour in glass. The interpretation of colour within the narrow band of the electromagnetic spectrum we can see as visible light depends on the

relationship between chemistry and our physiological perception.

In glasses, colour arises because of the selective absorption of electromagnetic radiation by transition elements. It can be varied by changing levels of oxidation of the glass. Mr Howard demonstrated the variations that could be achieved by reference to the iron/manganese system first used, inadvertently, by glassmakers in northern Europe in the 11th century who varied the colour by controlling air flow through the furnace. The widest range of colours available is based on copper, which gives colours from blues and greens to ruby.

CURRENT AND FUTURE USES FOR GLASS

Dr John Parker of the University of Sheffield, spoke about the vast range of current and potential future uses of glass. The use of glass for the transmission of information in optical form has led to the development of extremely pure and therefore colourless glasses with low transmission losses. Glassfibre is now the basis of modern telecommunications and lightguides.

The special properties of glass ceramics were explained and how they can be generated by controlled crystallisation. Dr Parker also outlined the other effects which can be achieved by coating and the use of rare earth colouring agents for lasers.

The meeting closed with the three speakers answering questions about glass. They successfully fielded questions as diverse as 'why do some glasses feel oily to the touch?' and 'what was the colouring agent used in the 17th century German deep red glasses?' ■

SOL-GEL '97

The objective of the ninth international workshop on glasses, ceramics, hybrids and nanocomposites from gels, organised by the Society of Glass Technology and the Centre for Glass Research, University of Sheffield, is to bridge the gap between scientific understanding and industrial application, so that the enormous future potential of sol-gel methods for innovative material technologies is realised.

Contributed papers have now been finalised and the final programme for the meeting is in preparation. It will be held at the Ranmoor Conference Centre, University of Sheffield on 31 August to 5 September 1997. For further information, please contact Ms Jill Costello, workshop administrator, Sol-Gel '97, at the Society of Glass Technology.



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