

SGT NEWS



Compiled and published by FMJ International Publications Ltd on behalf of the Society of Glass Technology

SPRING MEETING PREVIEW

IN PRINT

The April issue of Glass Technology has a feature on refractories and includes a report on the health and safety problems associated with furnace repairs, corrugated cruciform packing in a furnace regenerator, refractory metals for extended operational life and refractories in a studio environment.

The refereed papers are on chemical durability of soda-lime-silica glass bottles coated with sol-gel derived silica films, optical strength of sol-gel derived glass, crystallisation heat treatment of antimony containing slag glass ceramic and the effect of flexure testing procedures on the fracture statistics of glasses.

Physics and Chemistry of Glasses has a range of papers covering the short range order in tellurite-lead halide glasses, silicon/oxygen and sodium/oxygen co-ordinations in simulated metasilicate melts, characterisation of fluoride glasses in the $ZrF_4-ZnF_2-AlF_3$ system, mixed alkali effect of electric conduction from mechanical stabilisation of dissimilar ions, NMR study of the short range order in sodium borosilicate glasses, spectral studies of Pr^{3+} and Tm^{3+} ions in $PbO-PbF_2$ glass, magnesium solute effects on the dissolution kinetics of silicate glass, chemical bonding analysis of alkali oxide glass systems, and effect of temperature on redox equilibria in glasses and melts.

The Spring Meeting of the Society has been brought forward from its usual date in the middle of May as part of a co-ordinated effort by member organisations of the European Society of Glass Science and Technology to accommodate the Third ESG Conference in Würzburg on 21-24 May.

The Society's meeting will be held on 30 and 31 March at the Prince of Wales Hotel, Southport. It will explore the profitable opportunities that exist in all areas of the glass industry through the management of technological development. The conference begins with a keynote address from Dr John Nolan of Rockware Glass, looking at the market position of the glass container in the packaging sector. In a growing market, glass in some areas is losing its share. What lessons can be learnt from the past and how can they be used to exploit the opportunities that remain?

The following two papers on decorating by Nick Bird of PLM Redfearn and William Semple of Avery Dennison point out one of the ways in which glass containers can compete, enabling marketing and brand managers greater freedom for product identification. The development of clear film for the no label look and metallic inks or hot foil metallics are the state-of-the-art tools aiding this drive.

Oxygen and its role in melting provides the theme of the final

section of the first day. John Brown of Corning assesses the effects of oxy-fuel melting on the glass manufacturing process. The stability of melting and four-fold increases in water vapour above the glass are producing measurable effects in downstream forming and finishing.

Ron Argent of Frazier Simplex and Gordon Dickinson of Engineering Combustion Systems describe actual installations and make comparisons in efficiencies between two NOx reduction technologies - oxy-fuel and regenerative furnaces. Colin Smith and Nihar Tapadar describe the benefits of oxygen enrichment at Lax & Shaw, where BOC's flat flame lances have successfully achieved their initial objective of increased tonnage output while maintaining quality levels.

Dr Richard Quirk begins the second day of the conference with a description of Pilkington's approach to reducing NOx emissions by the '3R' process. The capital costs of installing 3R are less than 10% of alternative processes and there are significant reductions in operating costs without fundamentally affecting the design or operation of the regenerative furnace.

The demand on the glass industry that vehicle manufactures are making for improved ultraviolet and infrared absorbance in attractive colours are



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discussed by Kenneth Fyles of Pilkington. Addition of ferrous and ferric iron and the recent inclusion of Se, Co, Ni, Mn, Cr, Nd and Er colourants all have their predicted effects on properties but such high infrared absorbing glasses have their own melting problems.

Philips produces more than two million TV screens at its Simonstone glass factory in the UK. The quality benefits of investment in a new 140 tonnes/day furnace, pressing and pinning equipment, and annealing ovens are described by Dr Peter Heaton.

Isolated outbreaks of toughened glass failures caused by nickel sulphide inclusions have led to some bad publicity. Professor Michael Brungs of the University of New South Wales has investigated the limited but cost-effective ways of containing the problem for installed panels. The best method of eliminating inclusions is to keep the glass melt as oxidised as possible to dissolve the nickel sulphide. Chemical analysis of failed panels is used to support this theory.

Issues and challenges facing the glassfibre industry over the last four decades are explored by Tudor Williams, Evan Williams and Albert Lewis of the International Glass Group of Glass Inc International. How this part of the industry has changed reflects the many issues that glass has been through.

Optical fibre is finding many new applications as the advantages over copper wire become easier to utilise. How fibre optics are used to communicate restricted data, transmit close circuit television and

detect intruders in restricted areas will be described by Barry Griffiths of Remsdaq.

Former SGT President Neil McDonnell, an independent consultant, questions the influence productivity data has over the production of glass. Are the right targets being set, or have they been set to suit the demands of others?

Dr Ron Jones of Ceramic Developments reviews the performance of glass ceramic armour against ball round, armour piercing rounds and fragmentation. This new lightweight material is finding many new uses including a complete retrofit for Hercules aircraft dropping supplies into Bosnia

One year on from the unveiling of its I-Sight hot end inspection machine at the 1994 Spring Meeting, a speaker from Electronic Automation will review progress made. The agreement to supply the system to Emhart Powers under the name IRIS 20/20 and its commercial release early this year was a major achievement.

Plyglass is among the country's leading independent processors of flat glass, producing a comprehensive range of laminated, toughened and sealed unit insulated glazing products. The company's managing director Alan Twaite will describe the evolution of the insulating glass unit, question the resistance to providing 10 year guarantees and demonstrate that there is more to double glazing than getting rid of the salesman from your front room.



ADDITIONAL PROGRAMME

As well as the conference programme, Pilkington has agreed to a tour of its Greengate Works on the Thursday morning. Numbers are limited and anyone interested in attending should respond early to avoid disappointment.

The North West Section will host its local section reception on the Thursday evening. This will feature an illustrated talk on stained glass by Ruth Cave of the Master Glass Painters.

EXHIBITION

Space has been provided for an exhibition alongside the technical sessions. The following companies will be displaying examples of their latest products, services and technical literature: Avery Dennison, BOC, Frazier-Simplex Europe, MSC, SEPR, Stein Atkinson Stordy and TECO Europe.

ANNUAL DINNER AND DANCE

The Annual Dinner and Dance, held jointly with the North West Section, will take place at 7.30pm on Friday 31 March.

ANNUAL GENERAL MEETING

The Annual General Meeting of the Society of Glass Technology will be held at 10.00am on Saturday 1 April. ■



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Road, Sheffield
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PRESENTATION TO THE AMERICAN SECTION



North American Section Chairman Professor Jack Wenzel (left) receives his Badge of Office from SGT President Roy Nickels (photo courtesy of the American Ceramics Society).

The North American Section of the Society has been presented with a Chairman's Badge of Office

to commemorate its formation. The presentation to Section Chairman Professor Jack Wenzel,

of Rutgers University, was made by the President, Roy Nickels, during the 55th Annual Conference on Glass Problems in November 1994.

This event provided the venue for the council meeting of the International Congress on Glass and the Fall Meeting of the Glass and Optical Materials Division of the American Ceramics Society. The gathering in Columbus, Ohio, also provided the SGT with the opportunity to present fellowship scrolls to Professor Alfred R Cooper Jnr and Dr Alix Clare. Both had been unable to attend the Society Annual General Meeting in the UK.

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DISPOSAL OF WASTE REFRACTORIES

The problems and pitfalls of the disposal of waste refractories in a climate of ever-tightening regulations was the theme of the clinic meeting organised by the Furnaces and Refractories Committees. The varied interpretations of the Duty of Care Act, use of chrome refractories and the disposal of dust were all discussed.

Recent repairs have caused confusion with the glass furnace operator, the subcontractor and the local authority over the Duty of Care part of the 1990 Environmental Protection Act. In addition the Waste Management Licensing Regulations that came into force on 1 May 1994 served only to muddy the water further.

The Act provides a legal duty for the structured and organised disposal of waste with a commitment to see where it goes. A partnership is needed between the demolition subcontractor who is responsible for the disposal of waste and the operator who has to provide information on the material. The contractor must agree to which local authority licensed tip the waste goes, but one authority may refuse whereas another says use a normal licensed tip.

If the local authority has an industrial background and non-greenbelt sites, then it tends to be more open-minded to the issue of waste.

There is a degree of uncertainty in the ownership of the waste and this is where conflicting advice from

local authorities was reported. The possibility of leasing as an alternative to investment into capital projects also lengthens the chain of ownership of the materials involved.

The major portion of a demolished furnace is steelwork, bricks and rubble, the difficulty being in segregating special wastes such as those with a high concentration of hexavalent chromium. Hazardous materials as a proportion of the total may be very small but a single brick could have more than enough to change the designation of the whole. Disposal costs are directly related to the type of waste, special wastes having to pay the highest premium.

Flues represent an area which attracts the greatest concern; residues are vacuumed out first before the bricks are removed. Areas within some flues can have a strong yellow appearance due to Cr⁶⁺. The Australian glass industry clubs together to use a furnace on its last few days of production to vitrify flue residues before the furnace goes out. Another way is to trickle back the dust into the batch.

A material only becomes waste when it leaves the site. If the material leaves the site while it is being transferred to a new position on the same site, it is classified as waste and has to have all its relevant transfer notes.

Industries such as cement and steel have moved entirely away from chrome-bearing refractories to alumina. The steel industry criteria is that if an alternative to chrome exists it must be used. Suppliers of refractories for steelmaking must deal with the waste products. Should the onus be similarly pushed back onto refractory manufacturers for the glass industry?

Suppliers are not against recycling of old refractories as either new blocks or as bricks, cements and gunning but their own raw materials are very cheap, so there is very little incentive. ■

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 T Ensor,
United Glass Ltd,
Porters Wood,
St Albans,
Herts AL3 6NY.
Tel 01727 59261

Midlands

– Mr R W Fisher,
Sismey and
Linforth, Unit 94,
Heming Rd,
Reddich, Worcester
B98 0AE.
Tel 01527 529810.

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, Lathom,
Ormskirk, Lancs.
Tel 01695 54210

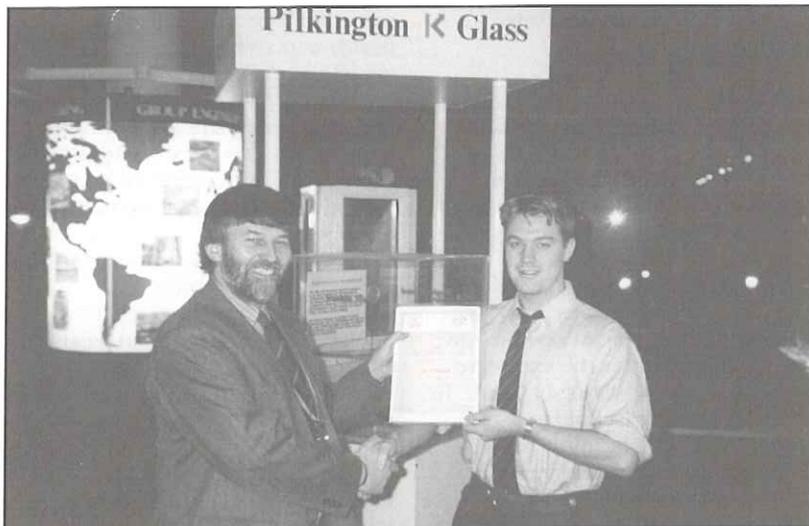
Scottish

– 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

COLIN MAYERS AWARD WINNER



David Nichol (right), receives the Colin Mayers Award from Dr David Martlew at Pilkington Technology Centre, Lathom.

David Nichol, a production operator at Pilkington's Greengate factory in St Helens, is the winner of the 1994 Colin Mayers Award for young people working in the glass industry. The award, organised by the Engineering Committee of the Society of Glass Technology and judged by Glass Training Ltd, consists of a certificate, £150 and a year's free membership of the Society.

AS SEEN IN YOUR REAR VIEW MIRROR



The North East Section of the Society took glass in automobiles as the theme of its winter meeting. Stan Davis of Schott was invited to develop this by describing the car mirror and its different forms.

Mirrors may represent only 1% of Schott business but it is a vital part of the company's presence in the automotive market. The customers, car manufacturers and spares suppliers are very price-sensitive and great pressure on costs and efficiency is needed. The car mirror is cut from blanks of float glass, its shape determined by the car model and it comes in four basic forms; the prismatic rear-view mirror, flat passenger side mirror, and the spherical and aspherical driver's side mirrors.

The prismatic mirror is flat with a silver coating. In normal mode, it reflects 90% of light. As a prism, it reflects only 4%.

The prismatic mirror is made from 6mm thick glass, one face being ground to an angle specified by the purchaser. The other mirror types are made from thinner glass (1mm or 2mm thick). The coating is generally silver, which is then copper-plated to provide corrosion protection and then lacquered for mechanical protection. They are cut-to-shape by sophisticated automatic equipment which optimises the available number of mirrors from any blank.

Expensive models have the edges of the mirrors ground and bevelled but this is not done for mass market cars. Adhesive tape is applied to the back of the mirror so it is ready for installation.

Coatings on mirrors are traditionally silver but silver salts may have environmental problems and the xylene lacquer is associated with lead in its production. This has led to the development of chromium coatings, sputter deposited on either the front or rear faces. Cars are adopting chrome, whereas trucks are sticking to silver.

Another coating option is the blue mirror which uses titanium dioxide and silicon dioxide layers on either the front or rear faces. The reflectivity from this coating is

dependent on angle and a self-dimming effect can be seen as the angle of light moves away from the perpendicular.

The spherical and aspherical mirrors have moved into prominence in order to deal with the blind spot experienced when being overtaken. The spherical mirror widens the field of view but reduces the size of the image. The aspherical mirror has a tightening radius towards the outer edge. This distorts the image but provides a

continuous mirror and gets rid of the blind spot; Schott produces the Aspherix brand.

The aspherical mirror has been adopted by many of the most safety-conscious car manufacturers and eventually could become compulsory. There was initial customer resistance because they were difficult to get used to but steady adoption has continued which makes it virtually inevitable that all new cars in the future will incorporate this extra safety feature. ■

PLATINUM COATING TECHNOLOGY

Expense is always the barrier to greater use of platinum group metals in any area in the glass industry. Johnson Matthey has addressed this by developing an advanced coating technology which uses a thin layer of corrosion-resistant platinum on a ceramic. Duncan Coupland and Rob McGrath from the company's Noble Metals Materials Division explained the potential of this technology to a Yorkshire Section meeting hosted by Gregg & Co.

Faraday used platinum equipment in experiments to improve the UK's optical glass to the same standards as German competitors. It has since been used in many areas where there are extremes of corrosion, high temperature and wear. The global glass industry consumes 3%-5% of annual platinum metal production but this figure hides the extensive amount of metal that is recycled. In an effort to increase the areas in which these metals are used, Johnson Matthey developed a coating process which places a 200µm layer on a range of ceramics and refractories.

Thermocouples were the first products to use the ACT process in the glass industry, using mullite substrates. Traditional clad thermocouples failed around the six month mark, whereas two years'

full service has been recorded with the new coatings. Johnson Matthey has set up dedicated production facilities to manufacture 150-200 coated thermocouples and they could be adopted as an industry standard.

Gathering balls for borosilicate glass at 1400°C, stirrers, gathering bowls, gob formers for TV screens, plungers for opal glass have all been used as demonstrations of the ACT capability. No problems have been recorded with satisfactory performance shown, even at the glass line. A thermal spray deposition process is used to apply the coating and this allows more complex shapes to be coated than can be clad. The screw for a Lindner feeder and stirrers are particular examples.

Single and triple orifice rings for borosilicate and bottle manufacturers respectively have been coated in the critical wear areas with a platinum alloy. The service life of both types has been well in excess of their traditional counterparts.

The ACT process is still expanding its application areas, with the possibility of introducing composite coating systems which show improved mechanical properties. The challenge is to find the most suitable substrate for the mechanical properties knowing that its corrosion is taken care of by the platinum. ■



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