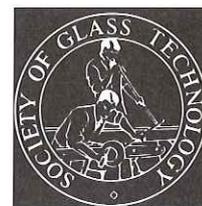


SGT NEWS



ATMOSPHERIC PLUME DISPERSION

The modelling of the dispersion of atmospheric pollutants forms an integral part of the procedures involved in obtaining operating licences for a wide variety of processes. Dr Norman Wright, of Pilkington, presented a lecture on the approaches adopted for chimney stacks in a sector of the glass industry to a joint meeting of the SGT North West Section and IoM North West Ceramics Group held at the World of Glass, St Helens.

Atmospheric pollutants from the factory chimney to the air

include NO_x , SO_x , fluorides, chlorides and particulates. There are specific limits on their release to the atmosphere, which are monitored by the local authority in the UK. A good model of the dispersion from a plume will give the local authority an indication of the most likely areas, which will be affected by the pollutants and the effects that developments at the source or in its neighbourhood may have on the locality. A properly calibrated simulation can be better than measurement at a wide number of locations.

WIND FACTOR

There are many factors affecting the dispersal of the waste gases from a furnace. The physics of the atmosphere have been studied for many years and wind is the main factor. The prevailing wind in any location can be measured and variations throughout the year monitored. Wind turbulence is determined by the surface roughness around the chimney, either natural variations in the landscape such as hills, valleys or flat stretches of water, or man-made alterations of the landscape, such as buildings. A vortex in the lee of a building may cause a serious downwash and lead to severe localised problems. There are six classes of stability, from A to F, covering the range from calm to very turbulent. Turbulence also comes as a political measure, usually as a count of the number of people shouting.

During the day, temperature increases with height but pressure falls with height counteracting the temperature gain. At night, there are inversions in temperature, which can lead to a restriction in the height that the plume can reach.

WORKABLE RESULTS

Computational fluid dynamics can produce a domain of calculating a model but calculation time and costs can be very expensive. Numerical, statistical and physical models can be used instead to generate workable results without such heavy costs.

A good physical model would involve a scale model of the area surrounding the site. This could be constructed based on maps and local surveys. The model can then be placed in a wind tunnel and the model rotated to determine the

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 D Rewborn,
Gorebond Ltd,
37 Manor Abbey Road,
Halesowen,
West Midlands.
Tel 0121 422 5425.

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.

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 Jadaupur
University, Calcutta 777
032, India. Tel 473 3496.

IN PRINT

Physics and Chemistry of Glasses has 10 refereed papers on: EPR and magnetic susceptibility studies on $\text{MnO-B}_2\text{O}_3\text{-CdO}$ glasses; complementarity of ESR and optical absorption of gamma-irradiated silicate glasses; TEM characterisation of an interfacial layer between silicon and glass; radiative transfer in a semi-transparent glass foam blanket; gas bubbles in glass melts under micro-gravity in an oxygen diffusion experiment; helium solubility in sodium silicate glasses and melts; preparation and characterisation of red glasses in the system $\text{TeO}_2\text{-PbCl}_2$; multi-photon reduction of Sm^{3+} to Sm^{2+} in a ZnCl_2 based glass; optical absorption spectra and energy gap studies in praseodymium chlorophosphate glasses; and a look at improved glass formation and unique structure of Bi based superconducting precursor glasses with some additives.

Glass Technology has peer reviewed papers on sintered glass ceramics from municipal incinerator fly ash; and the influence of $\text{Ba}(\text{PO}_3)_2$ additions on the refractive index and dispersions of fluoride glasses. There is also a collaborative study of ICG/TC2, 'Chemical Durability and Analysis' on the influence of some parameters on the approximation of European Pharmacopoeia and ISO Standard 4802: reasons for harmonisation.

EXTRA PAPERS FOR 2000

Later in the year, the papers from the Third International Conference on Borate Glasses, Crystals and Melts will be published in October and December *Physics and Chemistry of Glasses* and also the December issue of *Glass Technology*. There were over 50 papers and posters presented at the meeting held in Bulgaria in July 1999, which are separated into the relevant volumes from the Society. A collected volume will be available to acquire separately, or the additional issues can be ordered nearer to the publication date.

The Fourth Borates Conference will be held at Coe College in Iowa, USA, in 2002. The meeting will be jointly chaired by Professors Steve Feller and Mario Affatigato and sponsored by the Society of Glass Technology. More information will be circulated later in the year.



effects of different wind sources and speeds.

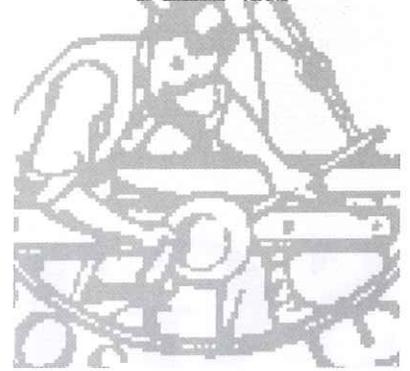
Numerical models of the plume can be simply based on a random fluctuation of the average wind speed and the use of a Gaussian error function of the exponential decay of the plume dispersion. From flue height and wind velocity, x , y and z co-ordinates can be determined for the concentration distribution of the plume. A peak can be assumed at the source of the plume, which disperses to an even distribution at infinity.

COMMERCIAL MODELS

Second generation models take the atmospheric instability into account. There are several commercial models, which can be licensed from various developers.

The first was the Industrial Source Complex Short Term Model (ISCST) which was developed in between the 1960s and 1980s, initially with chemical warfare from World War I in mind and later radionuclide dispersion from atomic weapons tests in mind. This model took the plume geometry and applied Gaussian reasoning to it. Thanks to advances in computing power, one-hour data slices for a whole year were generated.

ISCST was developed into a second generation model called American Meteorological Society-Environmental Protection Agency Regulatory Model (AERMOD). This is in use today and is in the public domain thanks to the USA's Freedom of Information Act. A



private licence can be acquired in the UK's Atmospheric Dispersion Modelling System (ADMS) for around £1600 but the licensee cannot look at the algorithm.

REGULATORY BODIES

Each of these models is approved by the regulatory bodies as tools for modelling atmospheric plume dispersion and there may be some favouritism in the UK regulatory structure for ADMS but not overtly so. ISCST will eventually be replaced entirely by AERMOD.

Pollution abatement issues concerned with eradicating peak values of flue gases involve either the primary reduction of pollutants at source through the use of an electrostatic precipitator, a taller stack and exit cone or an increase in the plume buoyancy. Precipitators are power hungry and expensive to run. Taller stacks give a better dispersion and good pull on the furnace but are expensive and have poor public acceptance. An exit cone is only effective if the exit velocity from the stack is low. Plume buoyancy can be increased by combining multiple flues in a single stack, a principle used by many power stations.

In the UK, the Meteorological Office is investing in promoting the ADMS package and its service for weather data. In other parts of the world, the weather and terrain data may be harder to obtain.

Based on the cone at the World of Glass, some typical dispersions were plotted using 1993 data. In order to satisfy the reduced maximum levels of modern times, the flue would have had to be raised to 80m, more than twice the height of the cone.

WORKS VISIT TO PILKINGTON AUTOMOTIVE, KING'S NORTON

Members of the Society's Midlands Section had the great pleasure of visiting Pilkington Automotive's King's Norton site, south of Birmingham on 9 March. The site produces a wide range of laminated glass components for the automobile assembly industry in the area, as well as further afield to other manufacturers in the UK. The site follows the parent company's principle of excellence in manufacture, as well as meeting the various quality criteria of car manufacturers. Most of the glass is for the original equipment manufacturer (OEM), rather than the replacement market.

Glass is delivered from St Helens in bulk to a spacious storage area where the stock holding is kept to a minimum. It is then taken to the start of the production line where it is cut, bent and laminated. The line was almost fully automated and continuous with only the autoclaving at the end of the line being a batch process.

At the time of the visit, the Nissan Micra windscreen was being produced. Everyone followed the process from plain sheets of flat float glass through to cutting, edging, screenprinting, bending, washing and laminating. The Micra screen does not have a complex curvature to meet, so sag bending on the special tools is simple. The furnace and tooling, though, is capable of dealing with some complex bending patterns.

There are some manual operations. Special products, such as the heated windscreens for Jaguar, have to be made in a very clean environment. The tungsten filament is fitted on the polyvinyl butyral interlayer before the two sheets of glass are married. Smaller autoclaves are used to seal this value-added product.

Integration with the ordering system at Jaguar means that special criteria have to be met at King's Norton. Once assembled and ready for dispatch, the Jaguar windscreens are packed on pallets in the exact order that they will be used on the Jaguar assembly line.

Another area was making the 'alpine' glass roof section for the Land Rover Discovery, with its own integral rubber seal. The rubber seal for this component has been designed for ease of assembly at the Land Rover assembly line.

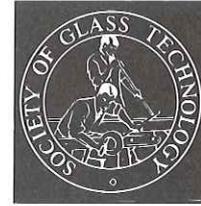
The clothing throughout the production environment was the same for the operators and management – there were no barriers to anyone contributing to a better workplace and a more efficient site. Quality control, preventative maintenance and safety were highlighted in special areas, as were the production figures. Ownership by all the workforce of all aspects of the site was apparent.

After a sandwich lunch, Ron Pritchard, of Teisen Furnaces, a neighbour in King's Norton, gave the vote of thanks in which he contrasted the current openness with the time he first visited the site many years ago. The staff at the plant was thanked for its hospitality and congratulated on the great strides it has made in satisfying the many varying demands of the automotive sector. ■



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SGT NEWS



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INTERNATIONAL CONGRESS ON GLASS 2001

The International Commission on Glass (ICG) was formed in 1933 to promote international collaboration and to disseminate information widely throughout the glass community. One way of achieving this has been to sponsor a triennial International Glass Congress. The Society of Glass Technology last brought this Congress to Britain in 1968. In the interim it has been held in such diverse places as St Petersburg, Madrid, Beijing, and most recently San Francisco. This last event attracted over 850 participants from 48 countries.

It seemed a fitting honour to Professor W E S Turner, who did so much to establish the ICG, that the first Congress of the new millennium be held in his homeland and the Society is honoured to serve as host. The Organising Committee warmly invites all involved in glass manufacturing, processing, research, education or art to Edinburgh, Scotland from 1 to 7 July 2001 to participate in this event.

President:
John F B Clark,
FSGT.

Honorary Secretary:
Brian McMillan.

Honorary Treasurer:
Mr R T Montgomery,
CA, FSGT.

STANDARD SAMPLES

The Society of Glass Technology has a range of standard sand and glass samples for analysis and calibration purposes.

GLASSES TC 'GLASSES'

Glasses are available in 25g packs at £65.00 plus postage (non members) £45.00 (members).

Standard Glass No. 4. Fluoride opal glass
Also available as 6mm thick sheets to special order, price on application.

Standard Glass No. 5. Soda-lime-magnesia-silica glass
Standard Glass No. 6. Soda-lime-silica glass
Standard Glass No. 7. Soda-lime-silica glass

Also available as 4mm thick pieces cut from flat sided colourless containers for x-ray analysis to special order, price on application.

Two lead glasses were received by the Analysis & Properties Committee but because of time limitations Glass No. 9 was not analysed by all of the collaborating laboratories. This glass has a lower lead oxide content, about 28% PbO, than Glass No. 8 and although it cannot be offered as a certified material, it could be useful as a subsidiary calibration check.

Standard Glass No. 8. Lead oxide-potassium oxide-silica glass (30.59 wt% PbO)

Standard Glass No. 9. Probable composition available.

NEW IN 2000

The Analysis & Properties Committee will complete its analysis for two new certified references for amber and green coloured glasses. The standard samples are expected to become available following approval by Council of the Society of Glass Technology in November 2000. The laboratories involved in the process have all followed ISO guidelines for the production and traceability of analytical data.

SANDS

Sands are available in 200g packs at £90.00 plus postage (non members) £70.00 (members).

Standard Sand No. 1. 200g packs at £20.00 plus postage (Al₂O₃ 0.061, Fe₂O₃ 0.014, TiO₂ 0.026).

Standard Sand No. 6. (Al₂O₃ 0.06, Fe₂O₃ 0.032, TiO₂ 0.024)

Standard Sand No. 8. (Al₂O₃ 2.07, Fe₂O₃ 0.26, TiO₂ 0.073, K₂O 1.06)

Standard Sand No. 9. (Al₂O₃ 1.35, Fe₂O₃ 0.103, TiO₂ 0.044, K₂O 0.82)

MAIN THEMES FOR THE CONGRESS

The main congress theme encompasses new directions for glass developments and applications. Specific topics are planned on: Raw materials for glass making; refractories, furnace design and operation; new goals in glass quality; water and gases in glass; sensors and control systems; glass fabrication and inspection; emerging applications for the 21st century; environment; mechanical and rheological properties; waste vitrification and glass encapsulation; sol-gel glasses and nanomaterials; glass surfaces, chemical durability and coatings; biomaterials; glass archaeology and archaeometry; glass art, design, techniques and history; glass education; glass structure and structure property relationships; computer simulation in glass science and technology; thermodynamics; novel glasses and applications; transport properties; optical glasses: science and technology; glasses for optoelectronics and telecommunications; atomic scale defects; phase separation, nucleation, crystallisation and glass ceramics; natural glasses; apart from plenary lectures of general interest, the Congress will be run as parallel sessions, introduced by invited lectures from eminent international glass scientists and technologists. Some topics, particularly those involving art and archaeology, will be run as one day sessions, thus allowing restricted registration and attendance for a specific subject area. Two poster sessions will follow



similar themes to those listed above. The official language of the Congress will be English.

ICG MEETINGS

During the course of the Congress, the ICG Council, The ICG Steering Committee and the Coordinating Technical Committee will meet. In addition several of the Technical Committees will organise short meetings, some of which will be open to any Congress participant. Information on these events will be included in the final programme.

EXHIBITIONS

The various ICG Technical Committees will have posters on display throughout the Congress, providing detailed information on their activities. Companies or individuals wishing to exhibit their products or to advertise particular services should in the first instance contact the Congress Secretariat. Organisations or institutions are especially invited to sponsor specific events during the Congress and those interested should again contact the Congress Secretariat.

PRELIMINARY REGISTRATION

Those interested in attending this major international glass congress should complete a registration form and return it to the Congress Secretariat to ensure that they receive the Final Announcement. Alternatively all the required information can be sent by email. An electronic form is available from the ICG XIX website.

ABSTRACTS

Potential Authors are invited to submit a 200 word abstract, in the required format by 1 September 2000, for consideration by the programme committee. Papers judged suitable will be allocated to the appropriate subject sessions. The Programme Committee will also select papers for oral presentation or as posters. Oral presentations will be offered on the condition that the author submits the extended abstract and pays the conference fee by the deadline of 1 March 2001. No Congress participant will be permitted to present more than one paper but may be a co-author of papers presented by other participants. All such contributed papers will be published as a two page extended abstract, which will be available at the Congress, along with the full texts for all of the invited papers, as a bound volume and CD-ROM.

The author(s) of contributed papers, presented at the Congress and considered appropriate for publication in full, will be invited to submit a

manuscript for inclusion in a special journal volume, subject to normal peer review. Details of the format for extended abstracts and papers will be provided with notification of acceptance; electronic submission will be preferred.

LOCATION

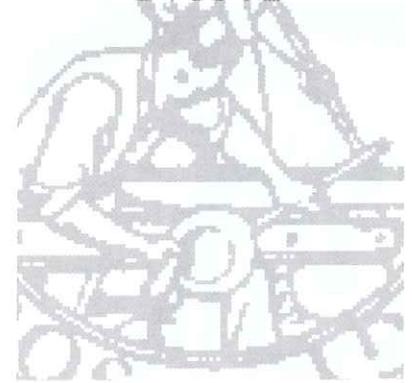
The Congress will be held at the Edinburgh International Conference Centre, situated close to the heart of the historical capital of Scotland. The city is renowned for its unique past, heritage, architecture and cultural vibrance. It is home to a world famous Castle and the Royal Palace of Holyroodhouse, so closely associated with Mary Queen of Scots. It hosts the world reknown Edinburgh International Festival and Military Tattoo. The city, containing three universities, is a traditional seat of learning. There is much for accompanying persons and off-duty delegates to do such as visit the Castle, walk along the Royal Mile, climb Arthur's Seat for a bird's eye view, travel down the old city's cobbled streets or simply shop for speciality items such as tartans and whisky. The Royal Yacht Britannia is also moored nearby.

International visitors can fly into Heathrow or Gatwick and take a Shuttle flight to Edinburgh Airport or alternatively travel by train. A regular coach service is available from Edinburgh Airport. The conference centre offers a range of facilities, which will allow parallel sessions or plenary events with up to 1200 participants. A full range of audiovisual equipment will be provided.

As regards weather, average temperatures during the day are 16°C-22°C and in the evening can fall below 10°C. While light clothing is recommended, visitors should be prepared for the occasional shower and cool evening.

Social Programme: From Dynamic Earth to the beauty of Crieff Hydro, Congress delegates will be able to view some of Scotland's sights at the welcome reception, day trip and traditional Scottish banquet. Accompanying persons may participate in a special programme which will include visits to central Edinburgh, the Royal Yacht Britannia and the historic Dalmeny House. Details of the post Congress tours will be released in the next documentation.

Accommodation: Delegates may choose from a range of accommodation - from the five star Sheraton Hotel to the University Campus of Pollock Halls. Prices will



correspondingly range from £150 pppn (\$240 pppn) to £30 pppn (\$45 pppn) for bed & breakfast. Full details and the special congress rates will be included in the booking form with the Final Announcement. Most hotels will be within walking distance of the conference centre. The central hotels are within walking distance of the Congress venue and also of the Royal Mile, museums, art galleries and Edinburgh Castle. The fee for the whole Congress will be approximately £450, *excluding* the banquet, excursions, VAT and accommodation. Students and invited speakers will be allowed a reduced Congress fee. There will be a reduced fee for single day attendance. Rates will be available in the next announcement. The fees for accompanying persons will vary depending on individual requirements. Single events will range from £25 to £35; the full programme will be available for a reduced rate. The Accompanying Person's Fee will not include the banquet, lunches, VAT and accommodation.

Congress Chairman: John F B Clark (UK)

Local organising committee:

S-J Dawson (UK), Dr P F Hart (UK), Prof M D Ingram (UK), Dr D Martlew (UK), Mr B W McMillan (UK), Mr R Montgomery (UK), Dr J M Parker (UK), Prof H A Schaeffer (Germany), Mr W A Simpson (UK), A Wells (UK), Prof A C Wright (UK, Programme Chair).

Secretariat: All correspondence and enquires concerning the Congress should be addressed to the Congress administration at the following address: ICG XIX, The Inbye, Watson Lane, Norwood, Harrogate, N Yorkshire HG3 1TA, UK. Tel: +44 (0) 1943 880491. Fax: +44 (0) 1943 880489. Email: anne.wells@selecthallmark.co.uk

Dates: Abstracts - 1 September 2000; notification of acceptance - 1 November 2000; receipt of invited papers - 15 January 2001; final announcement and registration forms - 15 January 2001; receipt of extended abstracts (for contributed papers/posters) 1 March 2001; and congress registration and accommodation reservation deadline - 1 March 2001. Additional information can be obtained from www.sgt.org



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