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The Official Journal of the Institute of Refractories Engineers



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**Don't miss the
THE REFRACTORIES ENGINEER
2023: Issue 2 - June**



The Refractories Engineer



Lynn Postle, FICME

From the editor

As we commence a new year, it is of course the ideal time to take stock of what the past year has meant for us as individuals and collectively. It has clearly been a year of turmoil for many throughout the world, with conflict and political unrest impacting greatly on both our home and our working environments.

It is somewhat of an understatement to say we are in the clutches of an energy crisis, the like of which many of us have never seen before. However, it is at times such as this defining moment, that the industrial sectors such as the refractories industry – which is blessed with engineering genius – are at their finest. When challenged to the extreme, we can innovate and rely on an inquisitive nature to navigate the difficulties and emerge with technological advances offering the solutions our customers seek, giving us (and them) increased optimism for the future. One such challenge is that of effective energy management, not just to reduce costs but also to ensure supply is sustainable for future needs. In this issue we put energy supply and efficiency under the spotlight to look at ways in which we can share knowledge and best practice to enable our energy-intensive industry to continue to prosper.

Alongside the topic of energy is waste management and indeed the more complex, but highly important, topic of waste to energy. There are examples in this issue of new options on the horizon that, whilst not refractory industry specific, do highlight that the way in which we produce, and indeed use, energy is changing to enable the industrial landscape to remain competitive and relevant. It's a challenging, but exciting, time for an industry that extracts minerals and uses a variety of materials to develop performance benefits such as resistance to high temperatures and wear endurance.

Readers will also note that we have introduced a *Refractory Insights* section that will enable us to provide a snapshot of focussed technical matters in each issue. Other changes this year include the IRE's decision to publish *The Refractories Engineer* as a quarterly, allowing us to print four bumper issues instead of six smaller ones, which means that we can bring even more information to readers in each issue, offering a dedicated mouthpiece for the Institute and the industry.

I would like to thank Katy Moss for her guidance, encouragement and professional leadership during my first year at *The Refractories Engineer* and I look forward to working with our new President Phil Walls, who has some fresh ideas for the journal, which will enable us to further develop YOUR favourite read in the coming months. Here's to an 'energising' 2023!

The Refractories Engineer is published four times a year and is circulated to Members of the Institute of Refractories Engineers. Whilst every effort is made to ensure the accuracy of material submitted, the Institute of Refractories Engineers cannot be held responsible for comments made by contributing authors.

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Design & Artwork:
Rivers Media Services
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Publisher:
Institute of Refractories Engineers
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Website: www.irengineers.co.uk



Message from the President

G'day fellow members of the IRE. My name is Phil Walls and I've taken over the presidency of the Institute of Refractories Engineers for the next couple of years, from our now 'Past President' Katy Moss. As you may well tell from my introduction, I am the first Australian President in the IRE's 60+ year history and I hope to further expand our organisation's reach across the globe.

Firstly though, I would like to thank Katy for her leadership efforts over the past few years. Not only has she led us through 'Covid', but also through a period of significant change within the IRE.

With her business background, Katy has instigated a branding change, led us through a modernisation of our rules of governance, has sought to make the operations of the IRE council open and transparent, has increased our membership through a corporate partnership program and recently run a successful conference and training day. For this, Katy has had the support of the IRE councillors, who have also volunteered their time and effort at no cost, and for that, as incoming President, I will be eternally grateful.

I would like to especially thank Sam Franklin from Eagle Refractories who presented the training day in November 2022 and who has been involved in IRE training for the past 15 years. Sadly, Sam has informed us that he cannot continue in this role due to other commitments. I would like to express sincere thanks on behalf of the IRE council for Sam's efforts over the years, and also pass on the gratitude of all IRE members who have participated in IRE refractories training. Sam will be sorely missed, but he has said that he will be on call as we look at how we develop training going forward. Once again, thank you Sam.

In addition to the volunteer positions, the IRE depends on external assistance.

The first to mention is Georgina Nicol who has taken on the role of Administration Assistant for council. Georgina's efforts have also been stellar and have contributed greatly to the day to day running of the IRE.

Next is Lynn Postle, the new Editor of the IRE's journal. A big thank you to Lynn for her technical savvy and editorial skills. Lynn is full of ideas, and I feel that the journal is in good hands as we go forward into a forever changing future for refractories.

There have been many other more minor changes in our structure, and more are planned as council members continue their work to make the IRE relevant to its members, corporate partners, advertisers and sponsors.

My vision is to further increase our membership, making the IRE the 'go to' organisation for refractories engineers, whether they are trainee students, graduates, company employees or senior management.

To reach this goal we have to offer our members what they need to continue their interest and growth in refractories businesses and organisations. This includes supplying relevant information, improved training opportunities, and networking events.

I am excited and looking forward to working with council toward these goals. A little about myself.

Although I've resided in Australia for the past 30 years (I still have a Pommie accent according to my friends), I am originally from the 'Old Dart' (England) and was born in Kent, a county to the south of London, where the Dover tunnel joins the UK to the rest of Europe.

I have always had (and still do have) great interest in materials, both natural (wood and clay) and manmade, and so I found myself studying Materials Science at the University of Newcastle-upon-Tyne. This was in the 1980s and while there I also completed my PhD in engineering ceramics (silicon nitride based – sialon materials).

I then moved to Japan to live and worked there at both Nippon Steel Corporation and Krosaki Refractories as they were known as then. After six years there, I moved to Australia and took up a position at the Australian Nuclear Science and Technology Organisation (ANSTO), just to the south of Sydney. There I worked on refractory materials involved in nuclear waste processing as well as in commercial projects involving materials to resist high temperatures, corrosion and wear.

After 16 years at ANSTO, I left to form Hitech Materials Pty Ltd, a trouble-shooting engineering consultancy focussing on solving materials related issues across a wide sector of industry. I continue in this role currently. www.hitechmaterials.com.au

I have been involved with ceramic and refractory materials for most of my working life and still enjoy keeping up with developments that are being made in these areas.

I am Past President of the Australian Ceramic Society and have represented Standards Australia and ISO on a number of standards committees including, ISO/TC 206 – Engineering Ceramics (previously), and currently on ISO TC 33 – Refractories, and ISO/TC 261 – Additive Manufacturing.

I hope that my knowledge and business skills will be of use to the IRE and I plan continued improvement of how we operate to benefit our members.

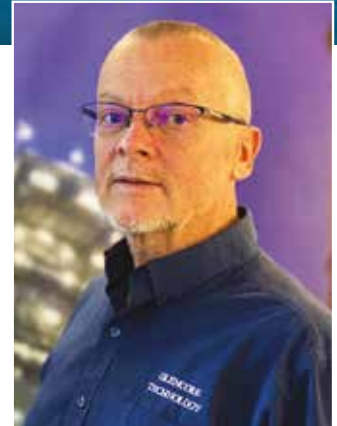
'Refractory' actually means stubborn, unchanging. That's great for the materials we work with, in the environments where they are used, but not for how our organisation operates. So, I plan to continue to further improve how we do things, how we attract members and retain them and how we promote 'refractories engineers' to the world.

Finally, I want to appeal to our members to consider getting involved in the running of our organisation. It is a chance to make a difference to our IRE. More information of positions on council will be posted soon. I hope you consider helping the IRE to flourish.

Sincerely Yours

Phil Walls

President, Institute of Refractories Engineers



Update from Australia

Hello from Australia. I hope that our readers have all enjoyed a fantastic holiday period and are refreshed and recharged for the year ahead. Certainly, as we begin a new year here in Australia, several of our members report being busy with shutdowns in progress or about to commence.

Whilst contacting several of our members in the lead up to the Christmas holiday period, people informed me they were busy preparing stock to meet delivery schedules and trying to fill last minute rush orders, to get various end users through the holiday break with sufficient materials on hand.

As someone who has spent a good number of years of their working life in the end user circle, it never ceases to amaze me how fine the line is sometimes between obtaining a record refractory campaign life, and an unplanned catastrophic failure!

In general, I'm noticing that there seems to be quite a few gaps in the knowledge base of various end users and graduate process engineers regarding refractory, compared to when I first entered the industry. At that time ~1987 there were so many people willing and able to share their knowledge on how to look after the bricks in a furnace. I remain forever very grateful for those who took the time to impress on me in my early days the need to get the basics right and continue a monitoring and supervisory process on a constant basis to keep them under control.

In turn now, I feel it is incumbent upon the IRE and our membership collectively to help preserve the skills and know-how in refractory design, selection, installation, and condition monitoring, that underpins all our respective industries. Our very survival depends on it.

I'm very pleased to be able to report here two events being hosted by the IRE in Australia. Firstly, our Western Australian chapter of the Australian Branch of the IRE are holding a refractories seminar on 21 February 2023 in Bunbury, at Sanctuary Golf Resort. It promises to be a great event.

Register at <https://mailchi.mp/9488586d8f39/institute-of-refractories-engineers-1-day-wa-seminar-february-21-2023?e=aa6da7cf00>

Contact the organiser, Don Merritt, on (0434) 780 403, email: don.merritt@4DDelta.com for more information if required. For further commercial discussions, contact Mike Walton (IRE Treasurer) on (0408) 565 086.

Further to this, the Australian Branch is holding its long-awaited conference (postponed from 2019), in Sydney at Rydges Sydney Airport, on Sunday 26 March with an evening welcome and registration, followed by a full conference day on Monday 27 March. For more detail refer to page 14.

Mark Prince
Brisbane, Queensland, Australia



Events Diary

Upcoming events to be added as dates in your diary

21 February 2023

IRE Western Australian Branch Refractories Seminar

Venue: Sanctuary Golf Resort, Pelican Point, WA, Australia
Contact: Don Merritt, email: don.merritt@4DDelta.com or visit: <https://mailchi.mp/9488586d8f39/institute-of-refractories-engineers-1-day-wa-seminar-february-21-2023?e=aa6da7cf00>

15-16 March 2023

The UK Concrete Show 2023

Exhibition and conference
Venue: NEC, Birmingham (UK)
Contact: www.concreteshow.co.uk

27-27 March 2023

IRE AUS 2023 – Refractory Innovations Underpinning Low Carbon Emission Technologies

IRE Australasian Branch Technical Conference and dinner
Venue: Rydges Sydney Airport Hotel, Sydney, Australia
Contact: Dean Tredinnick, email: deanbt1970@gmail.com or <https://www.eventbrite.com.au/e/institute-of-refractories-engineers-ire-aus-2023-tickets-517326967887>

28-30 March 2023

58th Annual St Louis Section/Refractory Ceramics Division Symposium on Refractories

American Ceramic Society symposium
Venue: Hilton St Louis Airport Hotel, St Louis, MO, USA
Contact: www.ceramics.org

12-16 June 2023

GIFA, METEC, THERMPROCESS, NEWCAST

Foundry, metallurgy and thermal processing trade fairs and meetings
Venue: Messe Centre, Dusseldorf (Germany)
Contact: www.gifa.com

28-29 June 2023

The Advanced Materials Show

Exhibition and conference
Contact: www.advancedmaterialsshow.com

9 August 2023

International Conference on Refractory Materials and Alloys (ICRMA) 2023

Venue: New York (USA)
Contact: www.waset.org

26-29 September 2023

Unified International Technical Conference on Refractories (UNITECR)

Venue: Kap Europa, Frankfurt (Germany)
Contact: www.unitecr2023.org

23-24 April 2024

Ceramitec 2024

Venue: Messe Munchen Exhibition Center, Munchen (Germany)
Contact: www.ceramitec.com

14-19 July 2024

International Congress on Ceramics

Hotel Bonaventure, Montreal (Canada)
Contact: www.ceramics.org/event

Membership Renewals

Membership of the Institute of Refractories Engineers offers a wealth of benefits and highlights a commitment to YOUR industry.

Remaining loyal to the Institute of Refractories Engineers shows to the wider industry that you and your company are proud of the heritage and professionalism of your leading sector organisation.

Members benefits include:

- A copy of the journal *The Refractories Engineer*, mailed direct to your door.
- Access to meetings and social media groups enabling networking opportunities with our refractories' community.
- The opportunity to submit papers for publication by the Institute.
- An IRE Membership Certificate to display in your premises.
- Discounted rates for meetings and other functions.

Make sure you don't miss out on all the latest refractory news and exciting improvements from the Institute of Refractories Engineers. Renew your membership for 2023 today, or sign up by sending an email to secretary@ireng.org



Corporate supporters

The IRE welcomes the following new Corporate Partners:

Bronze

Almatis, CHB South Africa, Dalmia GSB GmbH, Intermet Refractories, Robert Lickley Refractories Ltd, Trent Refractories Ltd, Velco GmbH

Silver

Imerys, LKAB Minerals Ltd, Mayerton,

Gold

Capital Refractories Ltd

Corporate Partner packages are a reflection of an organisation's commitment to the refractories industry and the professional institute that represents the industry. The IRE is appreciative of the support of our corporate partners and is delighted to be working with them for the benefit of the whole sector.

For more information on corporate partner packages refer to page 39.



Refractory Training Course for
HPI & Petrochemical
The Hague, Netherlands – 27-31st March 2023
Presented by: CHB – Third Party Refractory Inspectorate

Sponsored by:



Learn about the **Risks Associated with Refractory Materials** and gain an understanding of the **Limitations of Refractory Linings in Service**. The 5 days course will cover the life of Refractories in the HPI & Petrochemical Industry and includes a plant visit to Gouda Refractories and Silicon Anchor Solutions. Papers will be presented by the various sponsored industry specialists. **Seating is limited to 30 delegates** so register your interest early.

Need a copy of the brochure, contact
Darrol Biggs: dcbiggs@mweb.co.za or visit www.refractorytraining.com

DRAFT MINUTES of the 61st Annual General Meeting of the Institute of Refractories Engineers

Wednesday 9 November 2022

Member attendance surpassed ten individuals at the start and end of the meeting, therefore quorum was confirmed.

Proxy votes were made available, however none were received.

1. To receive apologies

Apologies were received from C Arthur, S Butcher, H Short and M Frith.

2. To approve AGM minutes held on 19 May 2022

The proposal to approve the last AGM minutes was proposed by M Lamkin and seconded by M Davies.

Minutes approved.

3. To receive a report from the President on the management and operations of the Institute

K Moss reported the following:

At the start of my presidency, I made a commitment to our members that I would endeavour to ensure the IRE would be: Sustainable, Relevant and Engaging.

To ensure sustainability

Increase to membership. I am proud to say that from when we truly understood where our membership level was, we have increased our numbers by 56 per cent since April and these are now at a much healthier level and on the rise monthly.

Clarification on Fellows. It came to light to council that some Fellows were not being charged membership whilst others were and as I am sure you can appreciate this is not a 'fair' situation and one which could continue without some clarity. When reflecting on the rules we found that the only 'free' membership was that of an 'Honorary Member' of which we have a few of those too.

A great deal of thought and discussion was had on this subject before taking the decision to write to those Fellows, thankfully most have accepted the fee, some of them also qualified for the retired rate and have happily paid to support the IRE. Where there have been issues raised, we have addressed these directly with the individuals. This was another regretful situation we found ourselves in, but we feel it has now been clarified and resolved.

Segregation of duty. We have now put measures in place to ensure segregation of duty amongst council which includes the process for making and authorising payments.

Journal Production. The November 2022 issue will complete a full year under our new publishers, we would like to say a big thank you and well done to Lynn, Andrew and their team for giving the journal a makeover and filling it with exciting content. We have noted a step change in the production and curation of the journal which is now more organised and topic driven. Given the challenges faced in taking this area over I think this has been navigated seamlessly and I am very proud of the journal we produce together as a team. Our focus is to build relationships for advertising to generate revenue for sustainability so we can keep the level of service we are used to going forward.

To stay relevant

Online members only area. We have just launched our online members only area which allows our members to access all the past journals together with the most up-to-date ones electronically as they are released. This means members are less reliant on the post and those who are travelling or live overseas can see the journal straight away. Ultimately, it may also reduce our overheads if members opt out of receiving a hard copy, we can reduce the postage costs for the IRE.

To be engaging

Attendance at Aachen. In September 2022, we attended the *Colloquium of Refractories* in Aachen and I had a stand for my company. In support of the IRE; myself, Rebecca Kennedy (IRE Member), Mike Lamkin and Andrew Turner (Journal) actively promoted all aspects of our organisation.

We had a very successful trip and this has boosted membership and advertising leads tremendously. I think everyone in attendance managed to get the full IRE experience and we shall be following up with each and every one of those contacts to bring them on board in the coming months.

Corporate Packages. We now have a range of corporate packages available. We recognised our members wanted to reduce their personal admin together with the need for larger organisations to support the IRE more proactively and be rewarded for this. So far, the uptake on this has been fantastic with ten companies having signed up in the last three months and lots more in the pipeline.

Acknowledgements

Corporate Partners. Thank you to the following companies for being our early supporters in this new era of the IRE: Imerys, Dalmia GSB GmbH, Capital Refractories Ltd, Trent Refractories Ltd, LKAB Minerals Ltd, Intermet Refractories, CHB South Africa, Velco GmbH, Mayerton, Almatiss.

In 2023 Council is focusing on

- Increasing membership and advertising revenue through promoting corporate packages.
- Streamlining the membership process.
- Greater training opportunities.
- Web-based activities for the IRE – expanding the membership area online.

Inspire your future and be part of the IRE

4. To receive a report from the Treasurer on the Institute's finances

M Lamkin reported the following:

The full position of the finances of the institute have only become apparent in the last year. Previous information suggested a higher advertising revenue than reality, albeit with an admission that it was declining.

However, also notable was the number of paying members; a precise number was not known but believed to be well over 200. In reality, the exact number was nearer 100. In addition to this there were around 30 non-paying Fellows. Many of the Fellows have retired status – but the non-payment costs the Institute about £1,500.00/year; or put another way: £10.00 of every member's fee was subsidising the lack of a fee for the Fellows. The Institute's rules did not state that Fellows did not have to pay fees but by convention they did not. The updating of the rules clarified the position and thus Fellows have been asked to start paying membership dues – the position of Honorary Member has no annual fee.

The Covid pandemic has also hit revenues as events such as the conference, dinner and training sessions have not yielded the normal funds. We anticipate a return on this year's conference of around £2,000.00. The consequence of these factors is that the Institute has been living beyond its means and is losing money. It is the main priority of council to return the Institute to balancing the

A heartfelt THANK YOU

Katy Moss reflected on her three-year presidency of the IRE at the AGM held in Sheffield on 9 November 2022.

I cannot begin to tell you how proud I have been to serve this Institute as your President for the last three years and to have witnessed the milestone of 60 years for the IRE to have passed.



The events that we are present at over the next couple of days (*IRE Conference and Training Day, Sheffield*) I hope you will enjoy, and I encourage you to give us feedback so we can build to make them bigger and better next time. Although I am sure with The Mowbray's reputation you will not be disappointed by the standard of the venue and food.

I want to thank each of our members for the support and courage you have given me during my tenure, this has driven me to make the much needed changes for the IRE's survival. My presidency coming to an end will not mean that there is any less support from me, but I am hopeful that with a little more time things will become easier to manage and be more future and ideas focused so we can all build our expertise and knowledge in what is quite frankly what I believe to be the most secret and magical industry that exists.

With a heritage of 60 years, the Institute of Refractories Engineers is a hub of knowledge and experience. It is a place where anyone in the industry can go to learn, progress and find out about new regulations and technologies – to train and to connect with others within the refractories community.

The aim is to capture the hearts and minds of existing members, but also that of a new generation who are looking to become part of it. The IRE aspires to be the heart and voice of the refractory community.

I wish our new President Phil Walls all the very best in his presidency and am glad he was able to make the trip to the UK to meet you all in person.



books. The change in publisher of the journal was made with the expectation of increasing advertising revenue. The council has also introduced several policies to increase membership. One of these is corporate packages which has increased revenue and membership.

As an example of the state of the finances, a budget forecast in July 2022 was made when the paying membership level was 146 and advertising revenue for the year was estimated to be £16,500.00. This resulted in a projected deficit of about £25,000.00. However, since this estimate the Institute has made good progress on increasing membership towards its target of 250 – there are currently above 180 full paying members plus a small number of retired/student members who pay a reduced fee. We anticipate an increase in advertising revenue with closer tie-up with the *Foundry Trade Journal* and greater take up of corporate packages. However, if we do nothing else the financial shortfall next year will be about £20,000.00. Thus, we do need to consider other ways to increase revenue and/or make savings. Options include the following:

- Increase membership fees from £83.00 to £95.00 – raises an extra £5,000.00.
- Increasing membership to 250 – raises approximately an additional £5,000.00.

- Requiring Fellows to pay fees – saves about £1,500.00.
 - Reducing the journal to quarterly – saves about £6,000.00.
 - Taking the journal to just electronic – saves about £12,000.00.
- Actioning some, if not all of these steps, will help cover the deficit, as will (of course) a significant increase in advertising.

5. To approve Council's recommendation that the published unaudited accounts for period ending 31 December 2021 be accepted.

K Moss explained that during 2021, much needed changes in the Institute, led to several extraordinary costs being incurred. A new accounting system was implemented, a new admin. assistant was hired, and the exiting admin assistant was paid six months' notice. Cost saving changes were undertaken, accounting tasks such as bank reconciliations and VAT returns were brought in-house and an active system of invoicing and debt collection was pursued.

K Moss also announced that in the interest of getting the Institute to be financially sustainable, for one year only, the journal production will be reduced to four issues.

Council is confident that 2021 is showing the worst-case scenario for the Institute's finances.

Approval to accept the year end accounts for 2021, proposed M Davies, seconded R Coggin.

6. To approve Council's recommendation for 2023 membership prices.

2023 prices: Full member £95.00
Members <25 undergoing training £48.00
Retired member £48.00
 Members in attendance were asked to vote for, against or to abstain.
 16 votes for approving the 2023 prices, 0 votes against and 0 votes to abstain.
2023 prices approved.

7. To welcome Philip Walls as incoming President of The Institute of Refractories Engineers and to thank Katy Moss for her presidency

P Walls was warmly welcomed as the new President of the IRE. It was noted that he will become the first Australian president. K Moss was thanked for her dedication to the role of President and it was noted how valuable her service was to the future of the IRE.

8. To note Council's decision to change accountancy firm

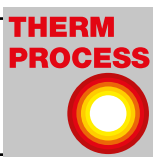
K Moss explained that Council had decided to change accountancy firms as the recent quotes received from alternative firms, had come in significantly less than what the IRE is charged now. The saving will be around £2,000.00.

9. Any other business

No other business was raised. Meeting was called to a close at 9.30am.

VDMA Thermprocess Forum at Düsseldorf's leading trade fair THERMPROCESS

The Thermprocess Forum will include contributions on energy transition and energy-efficient, sustainable thermoprocessing technology.



It will be held as part of the world's leading trade fairs GIFA, METEC, THERMPROCESS and NEWCAST in Düsseldorf from 12 to 16 June 2023. As part of THERMPROCESS, the 13th International Trade Fair and Forum for Thermoprocess Technology, the THERMPROCESS Forum will be held from 10.30am to 4.00pm on 13 and 14 June 2023.

All four leading trade fairs will be focusing on the mega themes: ecoMetals, circular economy and the decarbonisation of the metal and steel industries. These will also take centre stage at the THERMPROCESS Forum with the following focal themes:

- Flexible and resilient processes and technologies for new global challenges.
- Energy-efficient, sustainable and low-pollution thermoprocessing technology for effective climate protection.
- Digitalisation of processes and plants.
- Contribution of thermoprocess technology to recycling for an integrated circular economy.
- Tapping into productivity potential with innovative technical solutions.

The programme of the forum promises to host exciting discussions with its themed day on the 'energy transition' right at the opening on 12 June. Here light is especially shed on the

scientific, political and regulatory aspects for the thermoprocess sector. The second part, to be held on 13 and 14 June, will revolve around current developments in the industry.

Designed as a supporting event to the trade fair, the forum provides all exhibitors at THERMPROCESS 2023 with the opportunity to present their technology innovations and, hence, their company to a wider audience. The conceptual sponsor of the THERMPROCESS Forum is VDMA Metallurgy. In co-operation with Forschungsgemeinschaft Industrieofenbau (Research Association of Industrial Furnace Manufacturers – FOGI), it also acts as the organiser of this event. The forum will be presented in English. Trade visitors to GIFA, METEC, THERMPROCESS and NEWCAST are able to attend the forum at no charge using their admission tickets.

For more information and registrations for VDMA's THERMPROCESS Forum contact: Ingrid.kirchner@vdma.org

Since 1974 the international trade fair with Forum THERMPROCESS has been a guarantor for innovative thermoprocess technology. Technology trends and solutions for the production and use of industrial furnaces and heat generation plants provide the highest degree of information for the expert audience. Its ranges include industrial furnaces, industrial heat treatment plants and thermal processes, plants for special applications, construction elements and equipment as well as operating and auxiliary material, occupational safety and ergonomics. 5,923 trade visitors, over 50 per cent of whom came from abroad, as well as 337 exhibitors from 34 countries took part in THERMPROCESS 2019.

Retained EU Law Bill must be changed or scrapped says British Safety Council

The UK government needs to allow more time for departments to review and decide what to do with the thousands of EU regulations it is proposing to revoke, revise or retain under the Retained EU Law Bill, or businesses will face a legal "black hole" from the end of next year, the British Safety Council says.

The leading health, safety and wellbeing charity is urging the government to rethink the deadline in its legislation, of 31 December 2023, for all EU regulations to be automatically repealed unless a Minister decides otherwise.

Peter McGettrick, British Safety Council chairman, said: "Having left the European Union, it is right that the UK should set its own laws. But the government's *Retained EU Law Bill* allows too little time for too little scrutiny on changes to regulations which govern our safety, health and wellbeing. It risks opening a legal black hole, which will leave businesses in the dark and expose people to greater risk.

"The government's bill creates huge uncertainty for UK businesses at a time when they already face other significant challenges, including sharply rising costs, a slowing global economy and continuing market turbulence.

"The current timetable on this bill is unrealistic given the vast amount of work required by government departments to review and then potentially replace many thousands of pieces of regulation with new secondary legislation."

Many of the areas covered by the *Retained EU Law Bill* underpin and define protections, standards, and regulations we now take for granted, in our workplaces, shops and communities, as well as health and safety. These regulations determine everything from PPE provided to protect people in work, to working at height, manual handling, and dealing with asbestos.

McGettrick continued: "While improvements could no doubt be made to some existing regulations, the sweeping way the government is going about this risks leaving businesses, workers and the UK public open to future abuse, harm and unreasonable change. British Safety Council does not believe this is acceptable either to people in work or their employers who will have to manage the level of risk this creates for them and their businesses."

While workers in the UK will still be covered by the *Health and Safety at Work Act (1974)*, as well as common law, the bill creates uncertainty as to exactly what will and will not remain in UK law covering huge swathes of employment practice beyond the end of 2023.

Regulators will also be under increased pressure and may require more resource to fulfil their remit without a workable regulatory framework.

McGettrick added: "There is a danger of big gaps being created in our regulatory landscape and divergence between businesses selling into Europe, which still need to comply with EU law, and those which do not.

"We also know that regulators are already struggling to fulfil their expanded roles following Brexit, with a lack of resource and recruitment challenges meaning businesses and consumers are already facing increased safety risks."

A recent Public Accounts Committee report said that in attempting to create a UK version of the EU's chemical controls system, REACH, the HSE's Chemicals Regulation Division had required staff at the agency to spend a quarter of their time in training.

Immediate Past President of IRE becomes non-executive board director of MADE IN BRITAIN

Trent Refractories managing director Katy Moss, who stepped down as President of the IRE in November, has been appointed as a non-executive director of Made in Britain, the trade association representing close to 2,000 SME manufacturing businesses across the UK.

She is one of three new non-executive directors to the association's board, as it marks ten years of growth, the two others being Warren Gell, global commercial director, Dartington Crystal and Henry Beaver, chief executive officer, Beaver Bridges.

Made in Britain members enjoy licensed use of the Made in Britain registered collective marque, which shows clients, consumers and shippers that they can trust that a product is of truly British provenance and that it has been made to the highest manufacturing standards. Additionally, members receive support across exports, sales, marketing and PR via information services and events; feature in a searchable product directory used by consumers and procurement professionals to source British-made goods; and have free access to the organisation's *Green Growth* sustainability programme developed specifically for manufacturers.

Made in Britain board chairman Chris Harrop OBE said: "In the tenth year of the Made in Britain initiative, we are delighted to welcome to the board three outstanding individuals, who represent the innovation, ambition and resilience of the UK manufacturing sector today. The last decade has seen the Made in Britain marque become a well-known and well-loved symbol of high quality and British provenance, and our organisation is committed to becoming a yet more influential voice for manufacturers in the years ahead."

Speaking about her appointment Katy Moss said: "I passionately believe that the Made in Britain marque creates a powerful community that enables us to showcase our quality and provenance. If we all work together and support one another in our businesses we can maximise the manufacturing sector's value to our economy and protect our innovation and expertise for decades to come."

Warren Gell said: "Having worked within British manufacturing for over 20 years, I have seen how developing, designing and manufacturing products in Britain positively develops local economies, sustainable growth, people's careers and environmental benefits. I love to see products throughout the manufacturing process and being able to talk to the people with the skills and knowledge in making them. We at Dartington Crystal Group are proud members of Made in Britain and I welcome the opportunity to be an ambassador for the marque."

Henry Beaver, echoed the sentiments of Moss and Gell: "British manufacturing is at the very heart of the UK economy and is fundamental to its long-term sustainable future – we simply cannot underestimate the importance of our sector and its value to UK plc. It is hugely important that British manufacturers, the vast majority of which are SMEs, have a strong voice. Made in Britain does this brilliantly – and I am delighted to be joining the board at this exciting time."



The trio joins existing Made in Britain board members: Prof Chris Harrop OBE, ESG strategy director, Marshalls plc (chairman), Camilla Hadcock, owner and director, Roach Bridge Tissues, Peter Atmore, head of global sales and marketing, Fracino

David Osborne, the CEO of County Durham-based luxury shower parts manufacturer Roman Ltd, has recently departed the board after a six-year tenure. He completed two consecutive three-year board terms as a non-executive director, playing a crucial role in the governance and evolution of Made in Britain into the influential trade association it is today.
www.madeinbritain.org
<https://www.linkedin.com/company/made-in-britain-official>
<https://twitter.com/MadeinBritainGB>

Seven Refractories establishes UK business unit

Following a positive introductory year of agency sales in the UK market, Seven Refractories has decided to establish a full UK subsidiary, Seven Refractories (UK) Ltd.

"With this step, we plan to further strengthen our position in the British refractory market," said Erik Zobec, CEO of Seven Refractories.

"The quality of Seven Refractories' products, especially the green Seven Tap range, has contributed to a swift adoption amongst UK customers," said Grant Rennison, managing director of the UK venture. "We are convinced that with wider coverage there is potential to make Seven Refractories and its technology as renowned in the UK, as it already is in global refractory markets".

www.sevenrefractories.com



Grant Rennison, managing director Seven Refractories (UK) Ltd, (right), with technical manager Peter Watson (left)

Further acquisition inspires next era of sustainable refractory industry growth

HarbisonWalker International (HWI) is to be acquired by Platinum Equity, a global investment firm operating companies in a broad range of business markets. The board of directors say the acquisition plan ensures HWI's continued growth and leadership in refractory products and services. This supplements Platinum Equity's earlier acquisition of Imerys SA's High Temperature Solutions business (HTS).

Financial terms for the HWI acquisition were not disclosed. The transaction is expected to be completed in the first half of 2023, subject to customary closing conditions and regulatory approvals.

"This is excellent news for our employees, customers, and communities. Platinum Equity supports our intent to continue driving HWI forward into an unprecedented new era of growth," said Carol Jackson, chairman and CEO, HarbisonWalker International. "Over the past several years in North America and throughout our global operations, we've built operational excellence, differentiated ourselves through our supply reliability, and delivered the deepest and widest offerings of refractory products and expertise. Our new owner is wholly aligned with our leadership team's vision to aggressively accelerate investments in our business. We are poised to capitalise on the momentum that our team of employees has built together."

Platinum Equity partner Louis Samson said: "HarbisonWalker has built an impressive organisation, and we have deep respect for the company's legacy, culture, and commitment to serving its customers. We are excited to continue investing in its growth."

In July, Platinum Equity announced plans to acquire Imerys SA's High Temperature Solutions business (HTS), a provider of refractory solutions serving more than 6,000 customers primarily in Europe and Asia, in a transaction that was expected to close at the end of 2022. Once both acquisitions have been completed, HWI and HTS will combine into a global business with increased reach and scale.

"HWI's presence in North America complements HTS's business in Europe and Asia," added Samson. "Their product portfolios are also highly complementary and will create a comprehensive, well-rounded offering of brick and powder-based refractories for a global customer base. We expect the combination to immediately open up new avenues for growth on both sides."

Platinum Equity said it will seek additional opportunities to help the combined company grow both organically and through additional acquisitions in key product areas and geographies.

"The refractories industry is highly fragmented, and this combination will create a global platform with meaningful opportunities to further expand," said Platinum Equity managing director Malik Vorderwuelbecke. "We are excited about the prospects in this space and look forward to putting our M&A and operational resources to work."

Talks began earlier in 2022, with several potential buyers recognising HWI as a best-in-class North American refractory solutions provider serving hundreds of blue-chip customers across steel and industrial end markets. The complete value proposition includes technology-rich products, robust service capabilities, and a track record of innovation and operational excellence. Further, HWI demonstrates a clear sustainability commitment and is driving standards in the industry for customers and its operations.

With more than 150 years of industry leadership and global recognition, HarbisonWalker International is the largest supplier of refractory products and services in the United States. Headquartered in Pittsburgh, Pennsylvania, the company's international network spans North America, Europe, and Asia, with 18 manufacturing plants, 20 global sourcing centres, and the largest refractory industry research facility in North America. The company supplies virtually every major industry that requires refractory solutions to enhance production and protect assets.

Founded in 1995, Platinum Equity is a global investment company with approximately \$36 billion of assets under management and a portfolio of approximately 50 operating companies that serve customers around the world. Platinum Equity specialises in mergers, acquisitions and operations – a trademarked strategy it calls M&A&O® – acquiring and operating companies in a broad range of business markets, including manufacturing, distribution, transportation and logistics, equipment rental, metals services, media and entertainment, technology, telecommunications and other industries.

Since rebranding as HWI in 2015, the leadership team has embarked on numerous initiatives to strengthen its value proposition, reaffirm its commitment to customers, and shape its company culture. Projects have included the institutionalisation of the HarbisonWalker Business System (HBS) and a new enterprise resource planning (ERP) system, the building of a state-of-the-art monolithics plant in South Point, Ohio, numerous upgrades to its manufacturing facilities, and the creation of Alabama1, a new manufacturing plant and hub facility to serve steel customers in the southern US. The company has also restructured its commercial and supply chain organisations, people and organisational effectiveness team, and launched a project management office. In 2021, HWI formed its employee-led ESG sustainability initiative. Its Advanced Technology Research Center (ATRC), the largest refractory research and development lab in North America, continues to deliver new industry innovations for customers and is advancing a major recycling initiative.

As employees have focused on investments and improvements as one HWI, a unified culture has emerged that fosters high performance, loyalty, and engagement, as evidenced by its top-quartile employee engagement scores.

In addition, HWI, under its new ownership, is well-positioned to further capitalise on its progress related to several global megatrends driving refractories growth. These trends include reshoring – based on a need for a reliable US-based supply chain, evolving industrial use cases, and instituting ESG, sustainability, and recycling programs.

Strategic investment by OYAK to India

OYAK reinforces its power in the Southeast Asian market with its Almatís facility in Falta

The world's largest alumina producer Almatís, a member of OYAK Group Companies, has integrated the tabular alumina plant in the Falta region of India. OYAK will grow in the Southeast Asian market with the Falta facility, where semi-finished products will be produced from now on.

The tabular alumina plant in Falta, which OYAK has integrated backwards, has been a fitting response to the 'Make in India' call of the Indian government for producers. With this investment, Almatís has integrated the entire tabular alumina production process in India, where it previously supported some of its production with its own global operational network and has been operating since 1995.

Established on a total area of 32,300m², the development process of the facility with the latest technologies was completed in approximately 2.5 years. OYAK general manager Süleyman Savaş Erdem stated that the new investment of Almatís, the world's market leader in the specialty alumina product group, is a result of OYAK's vision and growth strategy. Focusing on foreign investments in the sectors it has been operating in recently, OYAK expects its Falta facility to contribute \$40 million to its turnover in the first stage.



The right investment in the right market

Süleyman Savaş Erdem said: "While we were defining OYAK's future vision, we set the goal of becoming a global player. In recent years, we have taken strong steps to achieve this goal in line with our growth strategy. Today, we produce uninterruptedly 24 hours a day in different sectors and maintain our leading role in the fields in which we operate. We are proud of the success we have achieved by putting our strategic decisions into practice. Our integrated production facility in India is the concrete proof of OYAK's power and greatness."

OYAK general manager Erdem emphasised that Almatís will increase its production volume in India, which is considered a virgin area in the refractory market, with this investment. Erdem said: "We have implemented the Falta facility in a large geography such as India, one of the fastest

growing countries in the world, with the understanding of 'the right investment in the right market'. We will meet the demands of the Southeast Asian market with tabular alumina to be produced at the facility."

Falta investment is just a beginning

OYAK's investment in Falta will be an important milestone for the supply of tabular alumina to the Indian market. By localising its operations, Almatís aims to be more compatible with the Indian market, thus managing fluctuations in market demand more successfully. The Falta investment is the beginning of Almatís' efforts to expand its operational footprint in the Indian market, which was once seen as a 'big leap'.

For more information visit:
www.almatis.com



OYAK general manager
Süleyman Savaş Erdem

About Almatís

Operating for more than a century with nine production facilities in three different continents, Almatís produces in 68 countries with its century-old experience. The company is the global market leader of specialty alumina, one of the key inputs in many industries such as refractory, ceramics, polishing, glass, thermal interface materials, fabricated castings, catalyst carriers, construction chemicals, electronic manufacturing fillers, high voltage insulators and mechanical wear parts. In addition to the headquarters in the Netherlands, the group has three factories in the USA, one factory each in Germany, the Netherlands, Japan, China and India, and sales offices in Brazil, the USA, Germany, India, Singapore, Japan and China, as well as six application-product development labs.

Innovative high-performance ceramics products for 'NEW SPACE' applications

As one of the leading high-performance ceramics specialists, Kyocera showcased its products at Space Tech Expo 2022, held in November in Bremen, Germany.

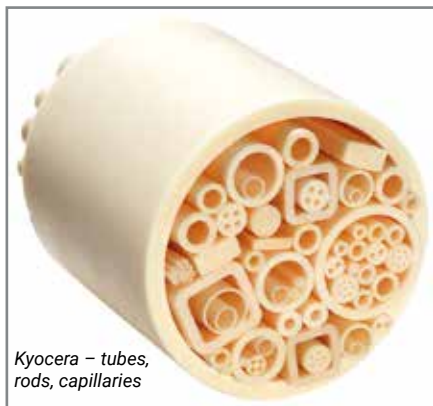
During its presence at *Space Tech Expo*, Kyocera focused on high-performance ceramics technologies for applications in 'new space'. Above all, this branch symbolises an innovative sector of the aerospace industry that poses extreme challenges for the existing material and supply chain industry. Applications in this field require particularly compact designs that simultaneously offer improved properties and functionalities. For example, these solutions enable the next generation of satellites, propulsion systems as well as other aerospace components and systems.

Relevant high-performance ceramics materials such as cordierite are ideally suited for such applications and enable smaller, more compact and light-weighted systems. Compared to competing materials, cordierite allows a weight reduction of up to 70 per cent and also convinces with a minimal coefficient of thermal expansion. Kyocera's proprietary silicon infiltrated silicon carbide (SiSiC) offers superior strength for designs with cavity structures such as cooling channels or other highly stressed components. In addition, Kyocera has advanced its expertise in the field of oxide high-performance ceramics, which can be used in propulsion systems, for example. Kyocera is also a specialist in high-performance ceramics to metal assemblies for ultra-high vacuum applications.

Perfect properties for the demanding environment of space

Especially in the extreme environment of space, which requires highest precision and reliability, high-performance ceramics products prove their unique properties. Compared to other materials such as metal or glass, high-performance ceramics excel, for example, with high electrical insulation, high tolerance to extreme temperatures and rapid temperature changes, chemical resistance, high wear resistance, as well as high mechanical strength.

Kyocera manufactures high-performance ceramics components for a wide range of applications – including aerospace systems, industrial equipment, medical devices, and automotive components. To this end, the company offers over 200 different compositions of high-performance ceramics such as aluminium oxide, zirconium oxide, cordierite, aluminium nitride, cermet, mullite, sapphire, silicon carbides, silicon nitride, aluminium titanate, yttrium oxide and many more. www.kyocera.co.uk



Kyocera – tubes, rods, capillaries



Kyocera beam position monitor

MoU to decarbonise integrated steel plants in India

Tata Steel, one of the world's leading steel producers, has signed a memorandum of understanding with SMS group to reduce carbon emissions at Tata's integrated steel plants across India. SMS group will contribute its leading technological expertise in designing, supplying and commissioning plants with significantly lower CO₂ emissions.

Burkhard Dahmen, CEO and chairman of SMS group, said: "Our companies have a common goal to reduce carbon emissions from iron and steel production, as the industry is not only key to economic prosperity, it is also one of the largest CO₂ emitters. We are therefore very proud to team up with Tata Steel and are committed to supporting the company with its decarbonisation roadmap. This represents an important contribution in the fight against climate change and is beneficial for the Indian economy as a whole and especially for the communities located around the steel plants."

The MoU with Tata Steel is another milestone in SMS group's mission to turn metals green. SMS can draw on its unique positioning as an expert in all major metals, as a supplier of the complete process chain, including all upstream and downstream processes plus recycling, and as a provider of services covering automation, digitalisation, and consulting.

European foundries energy relief packages

The European Foundry Industry Sentiment Indicator (FISI) moved sideways in November. A minor improvement by 0.2 points brings the index to a value of 103.0 points, says the European Foundry Association, CAEF. While business expectations for the next six months have declined again, assessments of the current business situation surprisingly increased in November. Overall, both factors equalise each other in the calculation of the FISI.

CAEF reports that the extreme peaks in energy prices have not been noted recently. Nevertheless, due to the ongoing very high cost level in many countries, governments are working on measures to reduce the burden. These so-called emergency measures are regulated within the EU by the *Temporary Crisis Framework* as part of state aid law. On the one hand, complex

and insufficient relief packages are already emerging from this; on the other hand, the crisis shows that a strategic and practical industrial policy is still only being discussed inadequately. While the *Inflation Reduction Act* has been introduced in the USA, the EU is still concerned with negotiating on the *Carbon Border Adjustment Mechanism* (CBAM). This again might just become another case of "well meant and badly done" particularly bringing detrimental prospects to small and medium-sized foundries which are already under significant cost pressure.

Meanwhile the *Business Climate Indicator* (BCI) decreased in November. The decrease of 0.20 points brings the index to 0.54 points. The production trend observed in recent months as well as the assessment of (export) order-book levels significantly decreased. www.caef.eu

Expansion of partnership with investment to accelerate decarbonisation of heavy industries

ABB and transformational technology and engineering company Coolbrook have signed an agreement to accelerate the development, industrialisation and adoption of RotoDynamic technology to decarbonise hard-to-abate sectors such as petrochemicals and chemicals, cement and steel.

RotoDynamic technology replaces the burning of fossil fuel with renewable electricity as the energy source. The new agreement expands ABB and Coolbrook's existing partnership, launched in January 2022, and was signed at Imperial College in London.

It is widely recognised that the decarbonisation of heavy industries is essential to achieving net zero emissions by 2050. According to the International Energy Agency (IEA), chemicals, cement and steel production collectively account for 70 per cent of industrial CO₂ emissions, equal to approximately six billion tons annually.

ABB and Coolbrook will leverage their respective capabilities and resources to rapidly commercialise Coolbrook's patented RotoDynamic technology, which can electrify hard-to-abate industrial sectors. ABB will provide their automation, electrification and digitalisation expertise, as well as integrate their electric motors and variable speed drives, to further enhance Coolbrook's technology by optimising energy efficiency and operational processes. ABB's investment will also enable quicker technology readiness and increase corporate capacity to achieve the joint goal of industrial scale up.

"We believe that our RotoDynamic technology, which can help cut up to 2.4 billion metric tons of carbon emissions annually⁽¹⁾, is one of the major inventions of our time. Together with ABB we can speed up the development of this groundbreaking technology to help reduce carbon dioxide emissions from energy-intensive processes and bring about the beginning of a clean new industrial era," said Ilpo Kuokkanen, executive chair, Coolbrook. "ABB's global footprint and technology leadership will be key to accelerating market adoption."

"The electrification of heavy industry with Coolbrook technology will have a significant impact on our global decarbonisation goals," said Colin Ward, senior vice president chemicals and refining, ABB Energy Industries. "This new agreement with Coolbrook supports our sustainability strategy and commitment to helping our customers reduce their annual CO₂ emissions by 100 megatons by 2030."



Earlier in 2022 the two companies collaborated in the petrochemicals market to accelerate the adoption of Coolbrook's RotoDynamic Reactors (RDR) technology to reduce greenhouse gas emissions in steam cracking plants. Together they created a combined offering to reduce energy consumption by 30 per cent and improve yield by 20 per cent in ethylene production. Across cement and steel, Coolbrook's RotoDynamic Heaters (RDH) technology has potential to replace the burning of fossil fuels with high temperature electric heating to reduce carbon dioxide emissions and increase process efficiency.

Both RDR and RDH have received significant attention from leading players in chemicals, cement and steel industries, and Coolbrook has already started co-operation with major industry actors including Shell, CEMEX, Ultratech and ArcelorMittal. According to a study conducted by KPMG, RotoDynamic technology has an estimated gross market potential of approximately €400 billion and is expected to become the industry standard in industrial electrification.

ABB's Process Automation business is a leader in automation, electrification and digitalisation for the process and hybrid industries. ABB is a leading global technology company that energises the transformation of society and industry to achieve a more productive, sustainable future. www.abb.com

Coolbrook Oy is a transformational technology and engineering company on a mission to decarbonise major industrial sectors like petrochemicals and chemicals, iron and steel, and cement. www.coolbrook.com

(1) <https://coolbrook.com/the-pilot/>

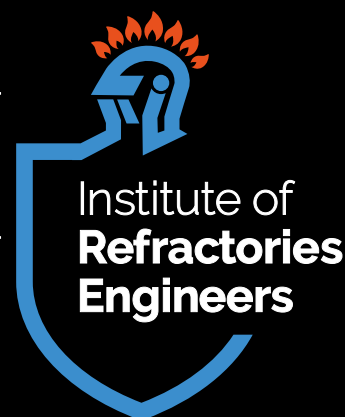
Technical Papers

The readership of The Refractories Engineer is keen to hear about the latest technological advances and research being undertaken to help drive the industry forward. Therefore, we are happy to receive technical papers from interested parties for publication in The Refractories Engineer.

All papers submitted must be original, written in English and have the approval of the author(s) prior to submission. They must either report original research work or be a detailed description of the latest technology or knowledge within a specific field related to the refractories industry.

Technical papers are required to be in a Microsoft Word format with any supporting imagery supplied as separate, high resolution jpeg files.

Submissions should be sent to the editor at advertising@ireng.org





IRE AUS 2023

Refractory Innovations Underpinning Low Carbon Emission Technologies

Sunday 26 and Monday 27 March 2023
Rydges, Sydney Airport Hotel

Presented by the IRE Australasian Branch

The IRE Australasian Branch is delighted to host the conference that was previously postponed from 2019 due to Covid restrictions. Participants are expected from all sectors of the refractories industry, including manufacturers, suppliers, end users and academia, and from all parts of the world. The branch would particularly welcome participation from domestic and international delegates, keen to come together and embrace what the region, and the industry, has to offer as we move towards a lower carbon future. The planned preliminary programme is opposite.



AT A GLANCE DETAILS

Sunday 26 March – Evening

Welcome Function

Monday 27 March –

Conference/Training Day

Monday 27 March –

Conference Dinner

Location: Rydges, Sydney
 Airport Hotel, Sydney,
 Australia

Organiser: IRE Australasian
 Branch

Cost: Members – A\$300.00;
 Non-Members – A\$400.00;
 End User/Retired/Student –
 A\$200.00;
 End User Speaker – FOC

Accommodation: The Rydges
 Special conference rate is
 A\$239.00 per night (superior
 queen room), including one
 full buffet breakfast. Book
 direct and mention the IRE to
 qualify for special rate.



Sunday 26 March 2023

18:00-20:00 Welcoming Reception –
Sponsored by Veolia



Monday 27 March 2023

8:30 Welcome, housekeeping – Mark Prince,
IRE Aus President

8:35 Conference opening – Phil Walls, IRE
President

Preliminary Programme

Session I Chair: Phil Walls, IRE President

8:45 – BlueScope Green Steel presentation,
speaker TBC

9:10 – 'Design of refractory linings in a
virtual environment before attempting
actual changes in the plant', by Frank Soto,
managing director, SOTO Group Pty Ltd,
Australia

9:35 – 'Optimised design for refractory lined
equipment', speaker TBC

10:00 – Networking / Refreshment break

Session II Chair: Greg Connor, IRE Australasian Branch Public Officer

10:30 – Liberty Prime Green Steel
Presentation, speaker TBC

10:55 – 'What is API 936? A discussion
regarding the American Petroleum Institute
(API) Standard 936, Refractory Installation
Quality Control, Inspection and Testing
Monolithic Linings and Materials', by Ivan Gray,
product development and testing engineer,
Vesuvius Australia Pty Ltd

11:20 – 'Monitoring multi-point sensors in
refractory linings', speaker TBC

11:45 – 'Cement kiln developments at Boral',
by Mick Dubokovich, consultant, Boral

Session III Chair: Dean Tredinnick, IRE Australasian Branch Secretary

13:10 – 'Mount Isa Mines Cu-Sm rebuild',
speaker TBC

13:30 – 'Furnace monitoring', Daniel
Zeelie, general manager, Saveway Furnace
Monitoring Africa (Pty) Ltd - South Africa

13:55 – 'Working with refractories – an update
on RCS', by Linda Apthorpe, lecturer: WHS
Academic Program, Occupational Hygiene,
School of Health and Society, University of
Wollongong

14:20 – 'The pros and cons of recycling
refractories', by Phil Walls, director, Hitech
Materials Pty Ltd, Australia, IRE President

14:45 – Networking break

Session IV Chair: Alan Blanch, IRE Fellow, Past President Au Branch

15:20 – 'Glencore technology update', speaker
TBC

15:40 – 'Value addition of matrix aluminas
in castable properties and performance', by
Shankha Chatterjee, applications & market
development manager India/SEA, Almatris
Alumina Priv Ltd

16:00 – 'Preparation and testing of site
samples' by Mark Herring, technical systems
manager, Shinagawa Refractories Australasia
Pty Ltd

16:20 – 'Green Steel R&D', speaker TBC

End of Conference

17:00-17:30 – IRE-Australasia AGM

19:00 - 21:00 – Conference Dinner, sponsored
by Vesuvius



SPONSORSHIP OPPORTUNITIES

In addition to the included number
of delegates, sponsors will have
the opportunity to access a display
area for brochures/product with
banner display if required, as well
as the opportunity to contribute to
compendium/ bags. The cost is as
follows:

PLATINIUM – A\$3,500.00
Three attendees free

GOLD – A\$2,500.00
Two attendees free

SILVER – A\$1,500.00
One attendee free

**For more information
on the conference or
sponsorship opportunities,
email Dean Tredinnick on:
deanbt1970@gmail.com**

**Conference Organising
Committee: Mark Prince
(Aus Branch President),
Mario Taddeo (Aus Branch
VP), Dean Tredinnick
(Secretary), Greg Connor
(Public Officer) and Phil
Walls (IRE President).**



Tim Hipperson, CEO of BizSwitch.co.uk offers some advice on how to avoid inappropriate sales tactics from energy brokers.

How to tell if you are being sold to by an energy broker

The UK non-domestic broker market undertakes an important role in streamlining the pricing and contracting element for businesses across multiple different verticals and sizes, however, it is facing criticism for not being fair or transparent in its dealings, resulting in some brokers making significant financial gain at the expense of UK companies.

With the number of brokers growing in excess of 3,500, and a market of nearly 3.5m companies to do business with, you would expect to see a TPI market innovating new products and services to win market share, whilst this is happening in some quarters it is clear that for most the innovation is in creative forms of miss-selling and inappropriate sales tactics.

However, these tactics can be identified and avoided if you look out for the following tell-tale signs.

Undisclosed commissions

Most brokers make their money via a commission model, known as an 'uplift'. Under this model the broker adds an uplift to the pence per kWh quoted by the supplier. For example, the supplier quotes 25p per kWh to the broker for your energy contract, the broker uplifts this by 2.5p, selling the utility to you at 27.5p per kWh.

The broker makes 2.5p per kWh consumed as their commission (if you consume 100,000kWh per year this equates to £2,500 commission each year). This commission is paid to the broker by the supplier either upfront or over the term of the contract, but it is you who pays the commission to the supplier.....you are paying an additional fee that you may know nothing about.

So how do you spot if this is happening? There are a couple of ways:

The first is the most obvious; has the broker told you how much their service costs? If not, it is likely that they are hiding the cost from you, which in turn means it may be excessive. Ensure that you ask them how much they are earning in commission, be sure to ask them to detail the unit rate 'uplift' applied, the annual commission paid and the total contract commission value, and ask that it be put in writing.

The second refers to the language the broker may use; brokers often tell their customers that it is the supplier who pays them the commission, cleverly avoiding the true fact that it is you who pays the commission to the supplier, who then simply transfers it to the broker. If this is the language your broker is using, then it is likely they are hiding the true commission from you. Another tip, check the broker T&Cs, if

it says the supplier pays the commission, alarm bells should ring.

Supplier favourites

A broker may have favourite suppliers, these suppliers are 'favoured' not because they provide you, the customer, with the best prices, but because they pay the broker for your contract quicker.

As a result, it is commonplace for a broker to only ever ask their favoured supplier for a price and not the wider market.

As a result of this 'favoured supplier' model you are not exposed to all the other suppliers and their potentially cheaper rates, in fact the unit rate you pay is often higher as the supplier charges more for this quick broker payment process.

If the broker only presents you with one price to consider it is likely they have only sought one price, the one that is best for them. Always ask your broker to provide details of each supplier they requested a price from and the details of those prices.

Selling fixed price contracts that are not fixed

The unit rate price paid for electricity is made up of several different charges. The first part of the of this price is the 'commodity cost', the actual fee for the energy component you buy, this makes up circa 45 per cent of the energy cost. The remaining 55 per cent is made up



of 'non-commodity' charges, these are fees for elements such as distribution costs, climate change levies or renewable obligations. Year on year these charges are increasing and are passed on by the supplier to you the consumer.

Under a **fixed contract** these 'non-

commodity' charges are included in the unit rate that you pay for every kWh you consume, however there is a second type of contract called a 'pass through' contract, and this is where the miss-sell happens.

Under a **'pass through'** contract you, the consumer, only contracts to pay the commodity price (the 45 per cent price) with the remaining non-commodity charge being 'passed through' at an additional cost on every bill. As such the unit rate that you are contracting for is not the full price you will pay each month.

Some brokers miss-sell pass through contracts by miss-leading consumers and hiding the fact that additional charges will apply on the bill. A 'pass through' contract has a much lower unit rate as some of the charges are not included and so appears to businesses, like yourselves, that they are receiving a cheaper deal when in fact it can be significantly more expensive once the additional, non-commodity charges, are included.

If it is a fixed contract that you want, then protect yourself by asking the broker to provide you with written confirmation that the contract is a fixed price contract and includes all non-commodity charges.

Also, check the contract before you sign it, does it say that it is 'fixed'? If you are unsure ask the broker and ensure you get any response in writing. Do not rely on a phone call confirmation as not all calls are recorded, therefore making it difficult to prove any wrongdoing and making it difficult to resolving any future complaint.

Market alternatives

The outbound, cold call telesales model that most brokers use is being challenged. New business energy price comparison websites, such as Bizswitch.co.uk, are now entering the market. These one hundred per cent digital services provide businesses with the opportunity to switch energy whenever they want, with no need to talk to anybody.

These price comparison switching services provide true market visibility in an unbiased manner, offering transparent and fair pricing.

The other alternative is to go direct to the suppliers themselves and cut out the middle man. However, with over 60 companies holding a non-domestic supply license this could be time consuming.

Whatever route you take, remember the rules above and always ensure you understand the cost of the service you are being provided. At a time when energy prices are rising and cost certainty is key, make sure you are not paying more than you should be, don't be afraid to ask.

First tests for power-to-hydrogen-to-power HYFLEXPOWER demonstrator successfully completed

ENGIE Solutions, Siemens Energy, Centrax, Arttic, the German Aerospace Center (DLR) and four European universities, together forming the Hyflexpower consortium, have announced the successful completion of the first stage of an innovative research project on renewable energy. Located at the Smurfit Kappa Saillat Paper Mill in Saillat-sur-Vienne (France), this program becomes the first industrial facility in the world to introduce an integrated hydrogen demonstrator.

The aim of the HYFLEXPOWER project is to demonstrate that green hydrogen can serve as a flexible means of storing energy which can then be used to power an industrial turbine. The hydrogen is produced on site with an electrolyser and used in a gas turbine with a mix of 30 per cent by volume hydrogen and 70 per cent by volume natural gas for power generation.

The project marks the implementation of the world's first industrial-scale power-to-X-to-power demonstration with an advanced turbine with high hydrogen content fuel. In 2023, trials will continue to increase the hydrogen ratio up to one hundred per cent.

While the large-scale availability of green hydrogen is still some way off, the members of the consortium are focused on looking beyond 2030 and trialing new technology, such as hydrogen, today. This project will allow the partners to understand the technical feasibility of using hydrogen while retaining much of the existing energy infrastructure. The partners say this demonstrator could open great perspectives for industry.

This highly innovative project involves significant collaboration across several industries, academic bodies, and research institutes. The project was inspired by the European Commission's (EC) 'Hydrogen Strategy for a Climate-Neutral Europe' report,

which outlines the essential role that hydrogen will play within the European Green Deal carbon neutrality and energy transition initiative.

The stakeholders involved in the project are ENGIE Solutions, Siemens Energy, Centrax, ARTTIC, German Aerospace Center (DLR), and Universities NTUA Athens (Greece), Lund (Sweden), Duisburg-Essen (Germany) and UCL (UK).

The project, first announced in 2020, involves significant funding by the European Commission, with two-thirds of the €15.2 million investment coming from the EU's Horizon 2020 Framework Programme for Research and Innovation*. The next trials for the HYFLEXPOWER project are scheduled for Summer 2023.

Commenting on the end of the initial testing phase, Gaël Carayon, project director at ENGIE Solutions, said: "Ambitious projects like this one require taking partnerships to the next level and being united in a joint mission to make decarbonisation a reality. Hydrogen will play a crucial role in the interaction between renewables and electricity storage and generation. ENGIE Solutions is proud to participate to this unique project."

Dr Ertan Yilmaz, HYFLEXPOWER global director at Siemens Energy, said: "With the HYFLEXPOWER project we are showcasing that carbon-neutral and reliable power supply is possible – even for energy-intensive industries. Hydrogen-ready turbines will play a decisive role in climate-neutral energy, so it is very exciting to be looking forward to the next phase of testing."

** This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 884229.*

An introduction to **INTERNATIONAL REFRACTORY STANDARDS ISO TC 33**

The International Standards Organisation develops standards for use around the world. Technical Committee 33 (TC33) is responsible for refractories. <https://www.iso.org/committee/47812.html>

The committee started in 1947 and currently has 15 participating national standard organisations and 22 observing members (who don't take part in developing the standards).

For example, in the UK the British Standards Institution (BSI) and in Australia Standards Australia (SA) have representatives on the working groups within TC33.

If you are interested in developing refractory standards (it's not for everybody!) then you are encouraged to contact your national standards organisation and get involved.

ISO/TC 33 Refractories	
Participating Members (15)	
Country	Organisation
Australia	SA
Austria	ASI
Belgium	NBN
China	SAC
Egypt	EOS
France	AFNOR
Germany	DIN
India	BIS
Japan	JISC
Korea, Republic of	KATS
Poland	PKN
Russian Federation	GOST R
Spain	UNE
Ukraine	SE
United Kingdom	BSI
Observing Members (22)	
Country	Organisation
Bulgaria	BDS
Colombia	ICONTEC
Cuba	NC
Czech Republic	UNMZ
Finland	SFS
Greece	NQIS ELOT
Hungary	MSZT
Indonesia	BSN
Iran, Islamic Republic of	INSO
Italy	UNI
Korea, Democratic People's Republic of	CSK
Netherlands	NEN
Pakistan	PSQCA
Philippines	BPS
Portugal	IPQ
Romania	ASRO
Saudi Arabia	SASO
Serbia	ISS
Slovakia	UNMS SR
Thailand	TISI
Tunisia	INNORPI
Türkiye	TSE

"ISO makes documents with required standards, specifications, guidelines or characteristics that can be used by companies to ensure that materials, products, processes and services are suitable for their purpose. Additionally, ISO ensures that these requirements are accepted in all member countries, to ensure standardisation."

Currently the standards under development are shown in Table 1.

ISO/AWI 16206	Phase quantitative analysis of residual quartz in silica bricks-X-ray diffraction method
ISO/AWI 20182	Refractory test-piece preparation – Gunning refractory panels by the pneumatic-nozzle mixing type guns
ISO/WD 21068-1	Chemical analysis of raw materials and refractory products containing silicon carbide, silicon nitride, silicon oxynitride and sialon – Part 1: General information and sample preparation
ISO/WD 21068-2	Chemical analysis of raw materials and refractory products containing silicon carbide, silicon nitride, silicon oxynitride and sialon – Part 2: Determination of loss on ignition, total carbon, free carbon and silicon carbide, total and free silica and total and free silicon
ISO/WD 21068-3	Chemical analysis of raw materials and refractory products containing silicon carbide, silicon nitride, silicon oxynitride and sialon – Part 3: Determination of nitrogen, oxygen and metallic and oxidic constituents
ISO/WD 21068-4	Chemical analysis of raw materials and refractory products containing silicon carbide, silicon nitride, silicon oxynitride and sialon – Part 4: XRD methods

Table 1 Standards under development

The current working groups are shown in Table 2.

Reference	Title
ISO/TC 33/WG 17	Chemical analysis
ISO/TC 33/WG 25	Refractory test piece preparation – Gunning techniques
ISO/TC 33/WG 27	Refractory mortars – Determination of permanent change in dimension on heating
ISO/TC 33/WG 31	Phase quantitative analysis of residual quartz in silica bricks

Table 2 Current working groups

A virtual meeting for TC 33 Refractories was held in January and the intention is to hold the next in Frankfurt, Germany, in September 2023.

In addition, there are Liaison Committees to ISO/TC 33. The committees listed in Table 3 can access the documents of ISO/TC 33.

Reference	Title
ISO/TC 24/SC 8	Test sieves, sieving and industrial screens
ISO/TC 163/SC 1	Test and measurement methods
ISO/TC 206	Fine ceramics

Table 3

Liaison Committees from ISO/TC 33

ISO/TC 33 can access the documents of the committees in Table 4.

Reference	Title
ISO/TC 24	Particle characterisation including sieving
ISO/TC 24/SC 8	Test sieves, sieving and industrial screens
ISO/TC 71/SC 1	Test methods for concrete
ISO/TC 74	Cement and lime [STANDBY]
ISO/TC 146/SC 2	Workplace atmospheres
ISO/TC 163/SC 1	Test and measurement methods
ISO/TC 163/SC 3	Thermal insulation products,
ISO/TC 206	Fine ceramics

Table 4

Organisations in liaison (Category A and B)

The following are organisations in liaison (Category A and B).

Acronym	Title
EC - European Commission	European Commission
PRE	European Refractories Producers Federation
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
WCO	World Customs Organization
WRA	World Refractories Association

Information on the TC33 Committee

- ❑ Secretariat: BSI
- ❑ Committee manager: Miss Deidre Fourie
- ❑ Chairperson (until end 2025): Prof Dr Olaf Krause
- ❑ ISO technical programme manager (TPM): M Stéphane Sauvage, ISO editorial manager (EM): Ms Isabel Veronica Nelson
- ❑ Creation date: 1947

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This article focuses on worker exposure to respirable crystalline silica in the refractories industry, writes Phil Walls of Hitech Materials Pty Ltd.



RESPIRABLE CRYSTALLINE SILICA in the refractories industry – part 1

Protection of workers' health and safety is of the upmost importance in any industry. As refractory materials often contain silica, we should be aware of this and understand the implications for employers and the workforce.

What is respirable crystalline silica (RCS)?

Crystalline silica surrounds us everywhere. The beach is full of it – sand – and I'm sure that some, if not all of us have had a mouthful of it at some stage!

In this form, as relatively large grains, crystalline silica (mainly quartz) is not harmful. The form of crystalline silica that is of concern has a much finer particle size.

Rather than millimetre-sized grains we're talking very fine particles, down to the micron (1/1000th of a millimetre) level.

In our industry, silica is often a minor or major component of the refractory materials we work with. The amount of silica present varies, depending upon the end use application of the refractory material and the operating conditions it is exposed to.

For example, pure one hundred per cent silica bricks are often used in coking ovens. At the other end of the scale, high alumina bricks, containing 95 or 98 per cent alumina, still normally contain some silica. So, care must be taken through all stages of production and use of these materials.

At each stage across the manufacturing chain, from raw material collection, through manufacturing, test sample preparation to installation and use, ultimately to demolition and disposal, there is a possibility that RCS will be generated.

Another factor to consider is whether crystalline silica forms within the refractory during exposure to process conditions. So, you may start off with no crystalline silica in the refractory but end up with some. This must be taken into account when removing material during repair or demolition of linings from kilns and furnaces.

How does crystalline silica become respirable?

For crystalline silica to be able to enter the airway and deposit in the lungs and create health issues, it must be fine in size and airborne. For refractory workers, that could occur when handling raw materials, cutting fired bricks, and demolition of linings.

To help avoid this, it is preferable for wet cutting and dust suppression to be used. Even better is to consider removing workers from these environments.

So, how do we work with it?

- ❑ Eliminate it from the material. **Difficult for refractories.**
- ❑ Substitute something in its place. **Possible by design.**
- ❑ Isolate from it. **Remote handling, robotic demolition.**
- ❑ Engineering controls. **Automation, dust extraction, wet processing.**
- ❑ Administrative controls. **Policies and procedures, how to do.**
- ❑ Personal protective equipment (PPE). **Sufficient for working with RCS.**

The full hierarchy of protective measures in the form of a workplace checklist can be downloaded from [www.safeworkaustralia.gov.au/sites/default/files/2020-09/Silica WES Checklist.pdf](http://www.safeworkaustralia.gov.au/sites/default/files/2020-09/Silica%20WES%20Checklist.pdf)

Potential source of RCA	Monitoring and Mitigation
Raw Material Handling	Particulate monitoring, dust suppression, remote handling.
Mixing and Processing	Wet mixing, dust containment, particulate monitoring.
Forming / Fabrication	Not such an issue as the silica is contained.
Firing	The free silica content can change during firing. X-Ray diffraction analysis should be used to identify the form of silica present.
Installation	Dry cutting of bricks should be avoided. Wet cutting produces a slurry which should be disposed of. As when dry, the silica component can become airborne.
Demolition and Disposal	Demolition can cause significant amounts of airborne RCA to be generated. Preferably robotic demolition techniques remove staff from potential exposure.

The table in this article shows how RCS becomes of concern in the refractories industry.

There are also a number of different forms of crystalline silica that need to be considered. All of these contain silicon and oxygen as SiO₂. The difference between them is how the silicon oxygen atoms are arranged. These three main forms are quartz, cristobalite, tridymite.

The OH&S limits for crystalline silica

Safework Australia

TWA = Eight-hour time weighted average
TWA 0.05 (mg/m³) for Cristobalite, Quartz, Tridymite

Carcinogen Category for Cristobalite, Quartz, and Tridymite is Carcinogen 1A

Testing standards for silica in refractories

Finally, the refractories technical committee of the international standards organisation, ISO/TC 33 refractories is in the process of preparing some standards for the refractories industry.

The first standard being compiled is how to quantify the amount of crystalline silica in refractory materials. In Part 2 of this refractories insights article, we will provide more information regarding how that is progressing.

Further Reading

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Waste to Energy ■

World's first carbon capture pilot for smelters inaugurated

The world's first carbon capture pilot for smelters has been officially inaugurated. The Mobile Test Unit (MTU), delivered by Aker Carbon Capture, is now connected to Elkem's plant in Rana, Norway, which produces high-purity ferrosilicon and microsilica.

The carbon capture pilot testing is a collaboration between Elkem, Mo Industripark, SMA Mineral, SINTEF, Alcoa, Celsa Group, Ferroglobe PLC, Norcem AS, NorFraKalk AS, ACT Cluster and Aker Carbon Capture. With full-scale implementation, 1.5 million tonnes of CO₂ can be captured from their combined emissions. Testing will soon commence at SMA Mineral.

Amund Vik, Deputy Minister from the Norwegian Ministry of Petroleum and Energy, spoke at the ceremony. He said: "There is no doubt that we need carbon capture, utilisation and storage (CCUS) to reach our climate targets. We need CCS in hard-to-abate industries to keep industrial jobs in Europe. This pilot will provide important learning related to CO₂-capture in metal industries, and will be an important hub for other companies in the Industrial Park to test CO₂-capture technology".

The Mobile Test Unit was built in 2008 and has continuously been upgraded in accordance with the latest technology developments. Aker Carbon Capture can offer customers a unique opportunity to test the technology at their site and de-risk the project prior to a possible full-scale implementation.

"Elkem is very pleased to be a part of this pilot. The world

needs more metals and other materials to succeed with the green transition, but we also need to achieve lower global CO₂ emissions. Carbon capture can potentially contribute significantly towards our global climate roadmap of reducing emissions towards net zero while growing supplies to the green transition. At the same time, Elkem is dependent on our stakeholders to enable green technologies at an industrial scale. That is why we are particularly pleased about the good collaboration between several partners in this project, and we will monitor the results of the pilot closely," says Elkem's CEO Helge Aasen.

Elkem's plant in Rana, Norway, was established in 1989 and today has around 140 employees. It produces speciality ferrosilicon products and microsilica based on renewable hydropower.

The pilot test is part of a larger R&D project, CO₂ HUB Nord, which runs over two years and is funded by Climit Demo. The main goal of the project is to verify the technology on real industrial gases from smelters and other process industries, to prepare a full-scale plant for industrial carbon capture.

Through development and verification of new technology for carbon capture, the CO₂-HUB Nord accelerates innovation and industrialisation of the carbon capture, utilisation and storage (CCUS) value chain. Industrialisation of such technology is considered as an important contributor to reducing CO₂ emissions and delivering on the global sustainability goals.

A WASTE MANAGEMENT philosophy that drives ENERGY EFFICIENCY

Having made the transition to process net zero in just 14 months and full carbon net zero in 21 months Midas Pattern Co Ltd, a polyurethane moulding company specialising in the manufacture and supply of PU RIM mouldings, is a fine example of how investing in energy efficient production can provide a genuine 'feel good' factor for all stakeholders and have a positive impact on the bottom line in a manufacturing business. Here, managing director Alan Rance MICME details some of the company's improvements in waste management and housekeeping as part of the company's #MidasGreenInitiative that have not only resulted in a reduction in wasted energy but have also fast-tracked the company's journey to carbon net zero. A win/win in terms of reduced energy bills, additional savings throughout the company, and a commitment to environmental responsibilities. It is a story that could be echoed throughout the refractories sector.

REDUCING FACTORY WASTE

Energy

A significant aspect of waste reduction on our journey to net zero is the recognition of how important it is to reduce wasted energy, after all energy use and its reduction is a massive part of any company's carbon footprint. So, once we had secured a truly green electricity supply from Ecotricity we set about reducing the amount of power we wasted, we replaced all lights with LEDs, we installed motion sensing switches everywhere that was practical, ensured all PCs were turned off at night, optimised all overnight electrical heating systems and we went to great lengths to make our compressed air usage as low as possible by investing in the latest high efficiency compressors and inventing cut off solenoids on the air feeds to our CNCs. All these measures cost money to implement but save far more in the 'not so long run' – why wouldn't you do that?

Cardboard

Midas has a zero waste to landfill (certificated) waste management policy, that is to say ALL waste is recycled or used as RDF (refuse derived fuel) so we used to recycle all of the waste cardboard that came into the business and we felt good about that, but when we realised we could repurpose that cardboard ourselves and make use



of it again before our customers recycled it, we knew we had to act. We purchased an industrial shredder and started to shred and use all our waste cardboard as a bulk filler within our packaging process. This meant that our waste cardboard provided one more use before recycling, highlighting our genuine green intent.

Design

Another significant reduction came about by design. We manufacture our tooling by CNC machining a pattern and then making a mould tool from that pattern. As we make enclosures up to 3m x 2m x 0.5m in size, some of our patterns are large and very heavy. Typically machined from polyurethane tooling board, we use huge amounts of raw material. We decided that by CAD modelling the 'B' surface of our patterns we could significantly reduce the amount of material we used. Of course, the additional CAD work and 'blocking up' would take extra time and add cost to the patternmaking but with some material cost reduction offsetting this, and the principle of producing much less waste being fundamental, we have been implementing this change for a couple of years now and have seen waste reduce significantly along with a measurable reduction in raw material costs. Obviously using less raw material and therefore producing less material waste must be environmentally positive.

REPAIR, RE-PURPOSE, RE-USE PHILOSOPHY

As manufacturers of the highest quality medical device enclosures, Midas knows that customers will eventually upgrade or redesign their devices which will make the enclosures redundant and therefore reach their end of life. To make their lifespan as long as possible, Midas actively encourages all customers to return their enclosures to the company when they are damaged, or the paint is scuffed or marked for a refurbish or full repaint.

This often means completely flattening the paint and reapplying the multiple colours required. Once painted the product may well need to be screen printed again as often logos or branding are screen-printed in epoxy ink for durability.

Once complete, this refurbish and respray (just as you would envisage on a well-used classic car) ensures the enclosure will look pristine for many more years and hopefully means the customer will delay introducing a new product prematurely.

In addition to the full refurbish Midas also offers a rebranding facility whereby they can remove stickers or screen printed logos etc. and even mask to introduce new colours and schemes, once again this can give the product a whole new lease of life which avoids environmentally unfriendly replacement or scrappage.

"In our minds anything we can do to extend the service life of our enclosures and therefore the instruments they enshroud has to be a good thing for the environment and our planet," says Alan Rance.

- ❑ 100 per cent LED Lighting
- ❑ 100 per cent BioGas
- ❑ 100 per cent Green Electricity
- ❑ 100 per cent Recyclable Packaging
- ❑ 650 Solar Panels
- ❑ Zero Single Use Plastics

HERE COMES THE SUN – A NO-BRAINER

With soaring energy costs, it is vital to understand the significant benefits to businesses thanks to the installation of solar panels.

Midas took the plunge in June 2020 when we installed 650 x 370w solar panels on two rooftops aligned to all four points of the compass, giving us the best possible energy recovery over the course of a year. We ensured that one hundred per cent of the available roof surface was covered, after all we wanted to get the best out of the technology. This equates to 2,000m² of panels.

The approximate £200,000 investment was funded through a seven-year hire purchase agreement where the monthly payment is less than the value of the electricity we would otherwise have to buy. This means that the project was self-financing from day one, moreover it was profitable for us.

We produce around 187,000kWh of power per annum – one hundred per cent truly green, carbon neutral, ethically generated electricity.

Of course, it is important for us to “do the calculation” on a regular basis to measure the success of the investment. Initially, we were predicting anticipated savings over 25 years in excess of £500,000. However, this estimation was prior to the 2022 energy crisis. I think we can all agree that things have changed somewhat since then. The cold, hard facts are that since June 2020 we have been gripped in the vice of an energy crisis that has caused our purchased electricity to increase by four hundred per cent, while our solar energy remains free of charge! Seasonal affective disorder (SAD) takes on a whole new meaning when managing an energy crisis; to say that our moods are lifted and we are smiling when the sun is shining is an understatement!

Through the peak generation months of June, July and August we can produce more power than we use. All exported electricity, that we can't use, provides an income stream, and creates carbon credits that help to get us to carbon net zero.

Over a year we generate around 39 per cent of our annual electricity requirement, the original estimate being 32 per cent, so the system has exceeded our expectations.

In the past when asked about the benefits of solar panels I have always said

that in a commercial situation, their installation is a “no brainer” and I firmly believe that this is still the case. The payback is quick, even before the recent critical energy crisis, but clearly even more so now.

In addition to the positive impact on our energy costs, the investment helped us achieve Process Carbon Neutral in July 2020 and Carbon Net Zero by January 2021; something that we are extremely proud of. The feel-good factor of being able to feed the excess power during the summer months back into the national grid, to ensure less energy is being used elsewhere and less energy generated by fossil fuels, is also a real mood enhancer for all concerned.

The visual effect is also important. Nothing says “we care about the environment” more than a roof full of solar panels. It lets employees, neighbours, customers and suppliers know that you are serious about being an ethical, responsible manufacturing business, committed to a carbon net zero future.

At the end of the day, it's an easy fix and making the switch to solar energy has incredible benefits, especially at a time when energy savings are a fundamental part of our business philosophy. I can't see the costs of energy coming down any time soon, can you?

To view our installation process visit: www.youtube.com/watch?v=39nVlaJZ4pg

COMPRESSED AIR – CHECK FOR WASTE

Compressed air is often the forgotten cost on the shopfloor. We use a lot of compressed air, so we invested in newer technology to improve savings, then we



■ Waste to Energy

looked at efficiency by reducing waste. We used solenoids to switch the airlines off when not necessary in our machining programmes – saving us 60 per cent of our running costs (a payback of 14 months plus a £20,000 reduction in costs each year).

My advice is to review your existing systems, identify the inefficiencies, retrofit any necessary improvements such as valves to close systems off when possible, identify all the leaks and stop them, and invest in the latest technology to ensure you have total control.

ALL WASTE ACCOUNTED FOR

We now shred all our own wastepaper, magazines, envelopes, even Christmas wrapping paper for use in our packaging. We also shred all our own cardboard and that of our three closest neighbours.

All that shredded material is used in biodegradable starch bags as 'packing pillows' that support and nest our moulded enclosures when they are shipped. In addition, we now only use 'brown paper', 'paper bubble', 'paper tape', 'paper strapping' and 'starch-based biodegradable shrink wrap' in our packaging, thus negating all single use plastics from our packaging processes.

So, not only do we give waste materials a new purpose and a re-use, but we also save a great deal of money on the way to those material being finally recycled. We think this clearly shows how being environmentally responsible is intrinsically linked with saving money.

All coffee machines use paper cups that are collected, segregated, and sent off for bespoke recycling. All tin cans are collected and recycled.

We have separate contractors to collect the paper cups and tin cans so that we can be sure they are properly recycled. All polyurethane waste whether tooling board, swarf, PuR waste or moulded PuR waste is segregated and collected by companies that re-process it and re use it, either as bulk filler or to recycle it into new material.

The balance of factory waste is placed in a single skip that is collected once a month and taken for sorting, recycling, and RDF (refuse derived fuel). We used to recycle 500kg a week and have our skip emptied once a week, the lorry travelled around 50 miles to collect and empty our waste. In our crusade to be truly green we invested in a waste compactor that enables us to squeeze 2000kg into our skip, meaning we only needed one collection a month, thus negating 150 lorry miles a month. This saved 150 miles per month of carbon emissions, particulate emissions, noise and social damage, we feel this kind of investment is what makes us truly green.

GOOD FINANCIAL SENSE – THE FIGURES

The reduction in cardboard waste and its re-use in our packaging process negated the purchase of 40 large rolls of bubble wrap per month, this saved us around £1,500.00 per month. Our cardboard shredder cost us around £6,000.00, so payback was achieved in four months with an annual financial benefit to the business of approximately £18,000.00.

With regards to our patternmaking material reduction, we now machine all patterns at around 50-100mm general wall thickness, rather than just machining solid blocks. We estimate that this has saved around 25 per cent of the material we used to use in the past on these larger patterns. Therefore, on a 3m x 2m x 0.5m pattern it is



conceivable we would have used 35 of 100mm tooling boards costing around £6,000.00, so a saving of £1,500.00 is significant to the pattern cost and a huge reduction in the cost of the waste produced.

As for our energy consumption, we data logged our compressor system before and after its replacement and the associated upgrades. This enabled us to clearly establish a saving of approximately 60 per cent of the energy we used to use in compressing our air, in real terms that's approximately £20,000.00 per year, savings which paid back our new compressor system and the shut off valve systems on our CNC machines within approximately 14 months.

Investments in solar technology, energy usage reduction, energy efficient capital equipment, shredders, compactors, improvements to factory facilities, staff training, and website development have cost around £275,000.00 since April 2019.

Savings from our solar generated power, energy savings, free packing materials, negated delivery costs and transport costs, are currently running at approximately £100,000.00p/a increasing to around £130,000.00p/a when our solar HP is cleared.

Of course, the benefit to the business in terms of genuinely green PR, marketing and sales growth, along with staff retention, staff attraction and respect within the local and national business community, is priceless!

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OUR GREEN CREDENTIALS

Carbon net-zero supply chain

ENERGY	INVESTMENT	WASTE	EDUCATE
100% Green Energy - Ecotricity/Bulb/Good Energy / Opus 100% BioGas - Crown Gas & Power On-site Solar Farm Reduced Electricity Consumption 100% LED Lighting Export Excess Energy	Energy-Efficient Compressed Air Setup Shut offs and valves CNC - Zero Waste 2 x Factory LED Lights 2 x EV Charge Station 3 Industrial Shredders Waste Compactor 650 Panel Solar Farm	Waste Reduction Reprocess all waste Cardboard & Paper Weekly to Monthly skip collection Zero Single-Use Plastics Recycling Bins Zero Waste to Landfill Multi Drop Couriers	Social Media Updates FTJ Environmental Page Energy Institute Award MAKE UK Award Dedicated Website - #MGI page/ForMV page Partnership with ForMV Bulb Discount scheme Midas Green Team

www.midas-pattern.co.uk

Green hydrogen production facility instigated in Switzerland

Hitachi Zosen Inova and the Aarau-Lenzburg Regional Waste Disposal Association will produce hydrogen at the Waste to Energy plant in Buchs (canton of Aargau). The main off-taker of the hydrogen will be Messer Schweiz AG in Lenzburg. This is HZI's second innovative project in the canton of Aargau within a very short time span after the delivery of a CO₂ liquefaction plant for a pioneering Swiss project in Nesselnbach was announced in September.

Energy transition to renewable energies will entail green hydrogen as high density and reduced carbon footprint energy carrier. Low-cost green hydrogen availability is key to facilitating the energy transition, and will be achieved by providing low-cost, surplus electricity to nearby consumers, which also reduces expensive logistical costs.

As energy from waste plants are intrinsically recycling facilities, using the electricity generated to produce hydrogen is a further step in enhancing the contribution of such facilities to the circular economy. In addition, hydrogen production can be either base load or fluctuating, to best match the availability of other renewable electricity generation, producing more hydrogen when wind and solar energies are high, and vice versa. Because hydrogen can be stored without losses, this chemical storage is more effective and more scalable than battery storage.

A joint venture project has been created for this purpose together with the Aarau-Lenzburg Regional Waste Disposal Association (Gemeindeverband für Kehrichtbeseitigung Region Aarau-Lenzburg or GEKAL) that will involve the Swiss-Japanese cleantech company constructing a first waste to hydrogen (WtH₂) small scale commercial plant. HZI will take care of all planning and construction work for the facility at the GEKAL site and will also be the owner and operator in the first few years. The hydrogen produced will be used as technical gas for industry and for early mobility applications, for example as green fuel for local public transport and private vehicles.

HZI will produce hydrogen and oxygen by electrolysis using electricity from the Buchs energy from waste (EfW) plant. The oxygen will be released into the atmosphere, while the hydrogen will be compressed and stored in special tanks.

HZI will use an alkaline electrolysis process that can produce 550Nm³/h of green hydrogen at 350 bar, meeting both the SAE 2719 and ISO 14687 quality standards for hydrogen fuel. The PtH₂ plant will also include a filling station. Its projected output is around 200 tons of hydrogen per year, equivalent to approximately 10-15 gigawatt hours of electricity. This is enough to keep a hydrogen-powered vehicle running for around 20 million kilometres, or to fuel up to 1'000 fuel cell cars per year. Lenzburg-based Messer Schweiz



Working together cost-effectively for the environment. HZI will construct a hydrogen production facility at the energy from waste plant in Buchs, which is owned by the Aarau-Lenzburg Regional Waste Disposal Association. Messer Schweiz AG will add the facility's output to its product portfolio as green hydrogen. Copyright photo: KVA Buchs

AG, who entered an agreement to take off the produced hydrogen, specialises in the supply of industrial gases and the new PtH₂ plant will represent a valuable, and above all, local source of green hydrogen, enhancing the circular dimension of the thermal recycling facility.

The new green hydrogen production facility will be integrated into the Swissgrid secondary control service framework, a novel concept for steering demand and oversupply within the Swiss power grid. When a primary producer goes offline, secondary producers such as the EfW plant in Buchs are brought online to stabilise the grid. So-called negative compensation is also possible if too much renewable energy is produced compared with the planned volume. In this situation, the hydrogen facility will draw up to 2MW from the grid, meaning that renewable energy producers such as wind farms will not need to be taken offline immediately or perhaps even at all.

Cost-effective and environmentally friendly joint effort

The construction of the green hydrogen facility will bring many benefits, both environmental and economic. GEKAL chairman Christoph Wasser explains: "Hydrogen production will allow us to be much more flexible. For example, when demand for electricity is low, rather than feeding electricity into the grid, we can use it to produce hydrogen which can be stored."

Fabio Dinale, vice president business development at HZI, adds: "The use of the energy produced by the Buchs EfW plant will be significantly improved by the hydrogen plant. This will contribute to reducing the plant's CO₂ balance by offsetting the production of fossil fuels. In this sense, further attractive technical solutions are conceivable going forward, including combining the hydrogen with CO₂ separated from the EfW's flue gases to feed a methanation production cycle."

Dr Hans Michael Kellner, CEO of the industrial gas specialist Messer Schweiz AG, comments: "For us as a buyer of the hydrogen, the new facility presents an ideal opportunity to effect a considerable increase in the share of green hydrogen in our product portfolio. Once the power to hydrogen plant is up and running, locally produced, green hydrogen will make up almost a third of our current local trading volume".

Full operations at the hydrogen facility at the EfW plant in Buchs are expected to commence in the spring of 2023.

www.hz-inova.com





INDUSTRY UNDER FIRE

but solutions are in our grasp

IRE Annual Conference 2022 Surviving the Energy Crisis

Methodology and tools to deliver refractories in a more sustainable manner, decarbonisation, energy saving options in refractories technology, energy bill relief and alternative fuels options; along with practical advice on a range of matters including lance storage to improve quality and performance, optimisation of the casting process and 3D printing technology for the refractories sector, were some of the highly debateable topics considered at the IRE's Annual Conference in November.

The IRE Annual Conference 2022 was held at The Mowbray – a unique, historic events venue in Sheffield city centre (UK) – on 9 November. The full day of technical and business presentations was supported by a candlelit dinner in the evening with



Conference presenters help the IRE celebrate its 60th anniversary, belated celebrations due to Covid

entertainment, and by a Training Day on 10 November.

Considering the current situation that affects all of industry, including the refractories sector, the theme for the conference was 'Surviving the Energy Crisis – Industry Under Fire'. Having taken an imposed break because of Covid, IRE members were once again able to mingle with like-minded people in a formal, yet relaxed, setting to discuss the most relevant issues affecting the global refractories sector. In addition, those unable to attend in person were able to log in for a virtual experience. However, the chatter in the room, highlighted the need for personal contact to truly benefit from the various networking opportunities delegates were able to take advantage of.

Making new materials that offer energy saving options was a particular focus, such as unlocking sustainable potential



of minerals, as was the need to increase the use of secondary materials. Inevitably the talk also turned to green steel (the manufacture of steel without the use of fossil fuels) and the "significant" role it can play in the quest to reach net zero.

Technical pathways and financial support to assist in decarbonising efforts were tackled by several speakers, as was the R&D into innovative materials that will help solve environmental and supply challenges.

With the theme of 'energy' running as a thread throughout the technical programme, many speakers offered insights into how the industry could address the ongoing dilemma of conserving energy and operating in a more sustainable manner. Chris Parr, vice president science and technology at Imerys spoke on 'Sustainable refractory raw materials: current and future perspectives.' As he stood to present, he warned delegates: "I have no answer to the energy crisis but looking further ahead we can see that sustainability and innovation are inextricably linked."

Innovation is a team sport

With plants around the world, Imerys has a global footprint for refractory raw materials, but Parr noted that this far-reaching coverage raised its own issues. "One of our challenges is to deliver refractory material to you as our customers more sustainably and reduce the 1.2mt of CO₂ emissions per year." The objective

he said is currently to "reduce our emissions by 42 per cent". Several projects are in place to achieve this. He explained that the company was tackling this through "driving an innovation culture". He said: "Refractories was a mature industry but going forward it won't be. Your customers are changing their products and processes, which will impact on what materials they want."

He said Imerys was aware of its responsibility. "We dig a number of holes around the world! We want to unlock the sustainable potential of minerals." Using a five-step process, the company looks at each product and each application for each product, then assesses options. Parr noted: "Reducing our footprint at final use is important: through the whole chain; through materials and systems where we are doing more with less; and through manufacturing process/innovation. We are talking about materials with some functionality but that are better for the planet."

Designing to reduce the company's environmental footprint offers a focussed approach to minerals and materials development. He said: "Perhaps refractory materials of the future will be dictated by the notion of their sustainability contributions rather than other attributes. Sustainability requires integration to make ideas a reality. Innovation is a team sport – we need to bring together all those in the value chain."

Partnership working is fundamental

Rob Ffello, CEO of the British Ceramic Confederation (BCC) claimed: "Ceramics is part of the solution to help the UK decarbonise." As if to emphasise the importance of coming together to share knowledge, he reminded delegates that: "partnership working is absolutely key." He said there was no option but to consider sustainable solutions. "The incentive to decarbonise was being pushed on industry. Now, it's a necessity. Energy costs are all over the place with numbers bouncing everywhere."

He spoke of how the BCC had reviewed its gas consumer priority list with regards supply issues. "Three quarters of BCC members are SMEs where continuous supply is vital. If your company is in category B or C you could still have a 'harm to life' situation if your power goes off and this causes a fire. Look at your back up situation, continuous supply might only be good for one hour!"

He noted the concerns BCC members were facing including pay issues in the face of a constant increase in energy bills. He also warned that whilst companies can "do sophisticated modelling", the "simple stuff is also important," saying: "The

simple stuff is a challenge at times. For example, thinking that you don't have time to repair the kiln because you are too busy!"

He also considered other challenges around carbon barriers and the competition the UK faces from other countries with less stringent regulations and commitments. "We could face a profound rise in UK carbon cost at a time when not at scale to do anything about this. It is a concern that we have an optimistic strategy that may be undeliverable." He said a better approach would be: "a smoother decline, rather than jumping off the cliff. This is preferable to the UK de-industrialising and pushing the problem offshore."

He said: "Emissions from manufacturing glass abrasives fell by 60 per cent, which is carbon reductions at a greater rate than the UK as a whole. However, this is by offshoring, so it meets the government targets but in the wrong way. We need a proper, co-ordinated long-term industrial strategy."

Whilst the energy crisis has gripped all those in industry, Rob Fello was optimistic about the way in which industry can move forward. "It is not an insurmountable problem," he said. "We've got to bring people together and share knowledge. We are under fire, but we have the solutions to solve this."

Katy Moss, managing director of Trent Refractories and the IRE President at the time of the conference echoed Fello's optimism, saying: "We are trying to get more refractories companies involved with TransFIRE*, cross-collaboration for the IRE could be a focus."

Rising costs – a challenge for the supply chain

In a practical presentation, full of examples and case studies, Dr Andreas Mertke, managing director of Dalmia GSB spoke about 'HM desulphurisation lances'.

He detailed the plant network of the Indian/German organisation and spoke about its "diverse product range" – burnt and unburnt bricks, monolithics, precasts, flow control and binders – mostly for the steel and cement industries. Of particular concern, he said, was the wear issues of lances and how they are influenced by production parameters – such as quality of welding and choice of anchoring system etc. He warned: "Sometimes lances are stored for over a year, and this affects quality and performance. Chemical stress, slag composition and so on.

Storage is very important, sometimes lances are left outside to the elements where rain can affect them."

He spoke of the many challenges in manufacturing them with what he called "dramatically rising costs for components in 2022", noting the "170 per cent increase for pipes compared to 2020." This was made up of hikes in prices for castables, special additives, steel components and heavy oil.

"Communication in terms of permanent dialogue between the lance producer and the steelworks needs to improve to understand the lifetimes and performance of the lances," he said. He left delegates with one final thing to ponder: "Will green steel require HM desulphurisation at all?"

Christian Wolf, managing director of Velco presented '50 years of innovation', a detailed account of Velco's history and the range of gunning machines they can supply and support. He concentrated on how the company has innovated over five decades.

Representing the cast metals sector, Piotr Bartowski of Novacast Systems AB gave a presentation on simulation of a melting process, pinpointing that "every casting counts". He said: "Let's reduce CO₂ by optimising the casting process." He detailed the company's solution to this with four of its products developed to "optimise castings financially as well as sustainably". He said the key was to "simulate as soon as possible in the design process".

Corporate social responsibility

Sebastian Klaus of Almatris reflected that: "Corporate social responsibility is something that must be built up, it doesn't happen overnight. It is a long-term commitment and ambition. Transparency must be shown to lead to success and in terms of the ambition, this must align with the UN Sustainable Goals. Any commitment will require goals and targets to be defined that ARE achievable.

"While global and a reliable supply is vital, we must remember that regional supply reduces our carbon footprint," he said.

'Green steel activity at the Metals Processing Institute,' was the topic of the presentation by Jon Bolton, chairman of MPI. He said: "Steel can play a significant role in getting to net zero. 1.9 billion tonnes of steel are produced globally, which is set to rise to circa 2.5bnt by 2050. This accounts for eight per cent of global energy demand and seven per cent of total energy sector emissions. Globally, on average, 1.85 tonnes of CO₂ are emitted for each tonne of steel produced. We must reduce emissions from the steel industry by 50 per cent to meet global energy and climate goals."

He went on to consider steelmaking

The event also saw IRE President Katy Moss hand over the Presidency to Phil Walls, who had flown over from Australia to be a part of the conference, and in doing so she enthused about the great strides the Institute is making as it embraces a growing membership and changing business conditions. "The Institute of Refractories Engineers is like a family, and we are building on that moving forward," she said. "I am delighted to hand over to Phil and wish him well. I would also like to thank Georgina Nicol (pictured below with Katy Moss) for her efforts in organising the conference and our council members for their unwavering support during my presidency. We are on the up!"

Phil Walls was equally confident about prospects for the sector. "There are lots of opportunities for refractories going forward," he said. "I'm a material scientist so I am very excited about these opportunities. However, the refractories industry is hidden. Let's continue to work to raise the profile, meeting up is an essential part of that. Also, cross-fertilisation of ideas between the refractories sector and the foundry industry will be of benefit."





Jon Bolton

process routes and how these can assist with reducing emissions from the sector, explaining that blast furnaces emit significantly more CO₂ than electric arc furnaces, but there are some quality limitations with the latter. He noted: "Helping industry to switch and work towards green steel (the manufacture of steel without the use of fossil fuels) will require technical pathways. Decarbonising requires support – technical, regulatory and financial."

He detailed some support to be considered such as the need to provide competitive energy, import control with carbon border adjustments, and access to funding. He also listed the UK government's strategies and funding options for decarbonisation.

"Technology exists to make inroads into decarbonisation," he said. "This can be scaled up, but funding is needed, and governments need to work with industry to achieve this."

During the Q&A, delegates asked how companies can access the available funding and were advised that TransFIRE is working on this. "Industrial engagement is key," Bolton said. "There has been difficulty engaging with industry and we need to get more people involved with this."

Katy Moss concurred: "Everyone is time poor. Industry needs to see a tangible benefit for its efforts and engagement. We can't just rely on people doing it for the greater good!"

Collaborative working for energy saving options

Phil Walls of Hitech Materials Pty Ltd, and incoming IRE President gave a presentation on 'Recent developments in

energy saving refractory materials and forming processes', which looked at energy saving options in terms of fibre boards insulation, nanotechnology, 3D printing of monolithic materials, hot-face bricks, aerogels.

He detailed various technologies and highlighted how the refractories sector can learn from the work already undertaken by other sectors. For example, with 3D printing of monolithic materials. "If you can 3D print a house, you can 3D print refractory materials," he said. "Our brothers and sisters in the concrete sector have done a lot of work on this, so there is some pre-existing knowledge. It is possible to make modular items that are otherwise difficult to make. There is lots of potential here for the refractories market."

He also considered the vital importance of recycling to save energy and money, especially options to recycle after the refractories have been used. "This is a little more contentious and difficult," he told delegates.

He explained the recycling target: "By 2025, we will include ten per cent secondary raw materials (SRM) in refractories. This will prevent approximately 150,000 tonnes of materials from going to landfill."

He enthused that the recycling strategy included: establishing on-site recycling solutions for used refractories at customer sites; setting up recycling facilities at manufacturing sites; and developing recipes that include recycled material.

"Some difficulties have to be overcome," he agreed. "There are lots of options to save energy by refractory engineering, such as: porosity control to reduce thermal conductivity using aerogels; continued development of engineered synthetic aggregates and bond phases; 3D printing of refractory components; and rapid low energy manufacturing of refractories."

"We really do need to engineer refractories to produce better properties."

Copies of the presentations are available, contact Georgina Nicol for more details, email: secretary@ireng.org Terms and conditions apply.

**Transforming Foundation Industries Research and Innovation Hub. TransFIRE is a UKRI funded (ISCF TFI challenge) proactive, interdisciplinary, inclusive research and practice driven hub with twelve research organisations based in the UK and more than 70 project partners from across the foundation industries, trade associations, professional membership bodies, civic sector and government organisations. TransFIRE aims to engage the full stakeholder community involved in transforming the foundation industries in interdisciplinary research for solutions that can be rapidly deployed within these industries.*





The Refractories Engineer

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The Refractories Engineer Editorial Programme 2023

Issue 1 - March 2023

- ❑ Energy Supply and Efficiency
- ❑ Mineral Processing
- ❑ Waste to Energy (WtE)/Energy from Waste (EfW)

Editorial Deadline: 19th December 2022

Advertising Deadline: 12th January 2023

Issue 2 - June 2023

- ❑ GIFA/THERMPROCESS Preview
- ❑ Iron and Steel Production
- ❑ Non-Ferrous Metal Production
- ❑ Material Developments



Editorial Deadline: 17th March 2023

Advertising Deadline: 11th April 2023

Issue 3 - September 2023

- ❑ Ferrous and Non-Ferrous Foundries
- ❑ Cement Production
- ❑ UNITECR 2023 Preview
- ❑ Heat Treatment Industries



Editorial Deadline: 21st June 2023

Advertising Deadline: 12th July 2023

Issue 4 - November 2023

- ❑ Glass Industry (shaped and flat)
- ❑ GIFA/THERMPROCESS Review
- ❑ Intelligent Systems and Digital Connectivity



Editorial Deadline: 21st September 2023

Advertising Deadline: 12th October 2023

The Refractories Engineer also includes regular *Technical Insights* throughout the year from industry experts covering a range of technical matters relating to refractories.





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Health News

Hell from Australia

Mark Press our President, goes on his busy schedule, has requested us to write the authors' address for ASG activities around New Zealand. Our success is achieved by working effectively as a team and being supportive of one another.

On the 15th of July, I attended "Pearson's healthy network".

In the 17th year of the ASG, Mark is Australia, the focus of the Management Team to coordinate support for members in New Zealand. There are many people who are involved in this group.

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Fax: 01748 826056
Website: www.gnatuk.com

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Email: office@rhimaginesita.com
Website: www.rhimaginesita.com

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S43 4AB, United Kingdom
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Fax: +44 (0) 1246 819573
Email: info@capital-refractories.com
Website: www.capital-refractories.com

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Gunform International Ltd

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Tel: (0151) 632 6333
Fax: (0151) 632 6444
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Website: www.gunform.com



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Celcius House, Lawn Road Industrial Estate,
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Brigg Road,
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Fax: (01724) 281577
Email: enquiries@trentrefractories.co.uk
Website: www.trentrefractories.co.uk

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Fax: (0151) 632 6444
Email: info@gunform.com
Website: www.gunform.com

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Website: www.therseruk.com

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USA
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Fax: (01724) 281577
Email: enquiries@trentrefractories.co.uk
Website: www.trentrefractories.co.uk

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Email: enquiries@trentrefractories.co.uk
Website: www.trentrefractories.co.uk

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Website: www.refractory-anchors.co.uk



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Fax: (0114) 276 7438
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Website: www.mach-int.com

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Email: info@gunform.com
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Email: sales@markham-sheffield.co.uk
Website: www.markham-sheffield.co.uk

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Website: www.gunform.com



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Fax: (01909) 731579
Email: sales@shl-refractories.co.uk
Website: www.shl-refractories.co.uk

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Fax +49 (0) 2051 2087.20
E-mail: cwolf@velco.de
Website: www.velco.de

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Institute of Refractories Engineers Corporate Packages

The Institute of Refractories Engineers is pleased to announce our new membership Corporate Packages, offering a host of benefits for companies involved in the refractories sector to expand their profile, gain more advantage from their involvement with the IRE, and attract new talent by being seen as a forward-thinking company committed to the industry in which they operate.

IRE Corporate Packages enable existing and new members to access an increasing number of benefits and they encourage greater input from individuals in the company. Each package enables a company to nominate a number of individuals for membership, plus giving the company an opportunity for added value at a highly competitive rate, including complimentary and discounted advertising in *The Refractories Engineer* and complimentary and discounted attendance at IRE conferences and courses.

There are three levels of **IRE Corporate Packages** – Bronze, Silver and Gold depending on the level of involvement and commitment required. One thing links them all – the chance to make a difference to your industry and your institute, in a cost-effective manner whilst also promoting your own company and investing in your people.

For more information and to take advantage of all the benefits an IRE Corporate Package has to offer, contact Georgina Nicol at IRE on: secretary@ireng.org or visit www.irengineers.co.uk

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A **Bronze Corporate Package** entitles a company to:

- ☐ Complimentary quarter page advert in *The Refractories Engineer*
- ☐ 2 x *Business Directory* entries
- ☐ 2 IRE individual memberships
- ☐ 1 online conference fee
- ☐ 1 online training fee

£900.00 worth of benefits for just £500.00

Additional benefits

- ☐ 10 per cent discount on additional advertising.
- ☐ 10 per cent discount on conference and training day attendance.
- ☐ 10 per cent discount on additional individual membership fees.

Silver

A **Silver Corporate Package** entitles a company to:

- ☐ Complimentary half page advert in *The Refractories Engineer*
- ☐ 4 x *Business Directory* entries
- ☐ 2 IRE individual memberships
- ☐ 2 online conference fees
- ☐ 2 online training fees

£1,434.00 worth of benefits for just £750.00

Additional benefits

- ☐ 12.5 per cent discount on additional advertising.
- ☐ 12.5 per cent discount on conference and training day attendance.
- ☐ 12.5 per cent discount on additional individual membership fees.

Gold

A **Gold Corporate Package** entitles a company to:

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- ☐ 6 x *Business Directory* entries
- ☐ 5 IRE individual memberships
- ☐ 5 online conference fees
- ☐ 5 online training fees

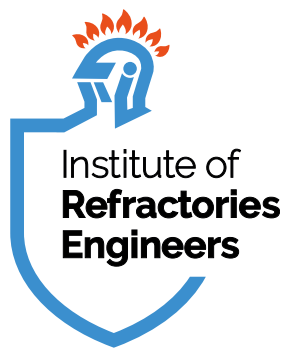
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Details of past and present employment in connection with Refractories

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Comments / further information

Signature

Date

Please submit this Membership Application Form to:-
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Unit 102, 88 Queen Street, Sheffield S1 2FW, UK
Email: secretary@ireng.org

All applications are reviewed by the General Council following receipt. If you are successful in your application, you will be notified in writing by the General Secretary, and we will issue a Certificate of Membership.

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Institute of Refractories Engineers, Unit 102, 88 Queen Street, Sheffield S1 2FW, UK

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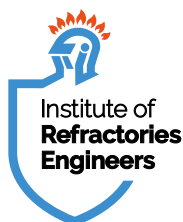
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YOUR Industry, YOUR Institute and YOUR global community

The Institute of Refractories Engineers is the heart and voice of the refractory family. Connecting people with application knowledge, sharing insights and best practice to benefit the refractories community.

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- ☐ The opportunity to submit papers for publication by the Institute.
- ☐ An IRE Membership Certificate to display in your premises.
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