

Iron and Steel Society Newsletter

Issue 3, May 2021

Editorial from Laura Baker, Chair of the Iron and Steel Society

Welcome to our third newsletter. A lot has happened since our last issue.

On your behalf, the Iron and Steel Society Board continues to be very active. As well as our regular board meetings, we have contributed to several Government consultations: in particular, on packaging and on the National Security and Investment bill. These have been great opportunities to promote the importance of steel as a strategic industry for the UK and I am pleased to see that there is a growing realisation of this importance as demonstrated by the flagship research initiatives showcased in this newsletter. PRISM, SUSTAIN, Transforming Foundation Industries ISCF challenge and the TFI Network+ all have complementary aims of bringing the industry together to tackle the big challenges that the industry faces – decarbonisation; circular economy and digital economy – if we are to meet our sustainability targets.

Sustainability is a key theme of the 12th European Electric Steelmaking Conference (EEC 2021). A casualty of COVID-19, we had to postpone this from 2020 to 2021. The team have not been resting on their laurels though, they have made the most of the digital technology that we are all now expert in and have delivered a series of very successful webinars. These act as a taster for the main event in September where we hope to be able to welcome people, in person, to our conference venue in Sheffield. More detail on the webinars and plans for the conference can be found in this newsletter – we hope to see you there!

The 12th European Electric Steelmaking Conference (EEC 2021) relaunches in September 2021 with an exciting new format.

Having announced the postponement of the conference from September 2020 to September 2021, the organising committee were faced with the dilemma of how to maintain interest in it. The solution turned out to be simple, organise webinars that showcase the content of the conference. This initiative comprised three webinars, each one highlighting two of the six topics, i.e. Webinar 1 - Process and Industry 4.0, Webinar 2 - Environment and Societal Challenges, Webinar 3 - Energy and New Plant and Technology. The seminars were successful in that each had circa 150 registrants and 115 actual attendees.

The next problem to be addressed was the impact of the global pandemic. We have had a few false dawns and at Christmas 2020 the situation was getting worse with national lockdowns and travel restrictions. The IOM3 sales and marketing team has come up with a unique solution that will address whatever the situation is in September, i.e. EEC 2021 will be a hybrid

event. So, while we look forward to welcoming our delegates to Sheffield, we understand that some may face travel restrictions. Therefore, the conference will be available as a conventional face to face format whilst at the same time be available as a fully interactive, virtual conference experience. The emphasis will be on delivering exceptional engagement, networking, and knowledge exchange between the onsite and remote participants.

A fourth webinar is planned for July that will give an update on the conference programme and at the same time showcase the depth of content that will be available for conference attendees.

It is worthwhile restating the key aims of this 12th European Electric Steelmaking Conference, which are to provide a forum at which steelmakers, product specialists, and all other parts of the steel sector supply chain (including the academic community and research and technology organisations) can come together to share information and exchange knowledge on current and future developments across the broad spectrum of electric arc furnace steelmaking and its associated technologies.

The conference will cover five principal technology-based themes – Process, Plant, Energy, Industry 4.0 and Environment & Society – The Sustainability Challenge. In addition, the SUSTAIN Future Manufacturing Research Hub will be running a workshop - *The Steelplant of the future - How to Achieve Net Zero* – on one day of the conference.

The conference is a must for senior managers, plant operators and graduate staff involved in the production of steel by the Electric Arc Furnace and all those associated with the steel sector, i.e. academics, researchers, steel users and suppliers of raw materials and equipment.

The conference offers leading steelmaking experts an opportunity to showcase their work by presenting and attending. More details are available at <http://bit.ly/EEC-21> or by clicking on the banner below.



EEC 2021 Sponsorship and exhibition packages are available which deliver branding, networking opportunities and an exhibition presence at both the venue and on the virtual conference platform. Please contact Sue Harris sue.harris@iom3.org or Julie Fitt julie.fitt@iom3.org for more information.

Bob Ruddleston

Executive Consultant, MPI and Chair, Organising Committee

Developments in UK Steel R&D Infrastructure

Materials Processing Institute

The Materials Processing Institute is a research and innovation centre operating at the cutting edge of technology to develop innovative methods for the manufacture of steel, metals and materials. Research is focused on developing new advanced materials, supporting industrial

decarbonisation, deploying digital technologies, and reducing waste through a circular economy.

MPI has a long and successful track record in research and supports innovation through the development and commercialisation of technology; this is delivered by scientists, engineers and project teams with expertise in materials science, using state-of-the-art equipment, laboratories, workshops, demonstration, scale-up and production facilities. By drawing on core Institute expertise, new technologies are introduced to increase yield and improve the quality of materials and processes.

PRISM – Delivering the Research and Innovation Priorities of the UK Steel and Metals Sector

PRISM is a project that is essential to the UK steel and metals sector and is being delivered by the Materials Processing Institute. The £22m R&D programme, first announced by the UK government in March 2020, is delivering research and innovation funding to support innovation in the UK Steel and Metals sectors in:

- Decarbonisation
- Digital technologies
- Circular economy

The programme funding is provided through Innovate UK, the UK's innovation agency.

The PRISM RD&I programme runs for 5 years until Autumn 2025 and will help improve the commercial viability of UK steel and the wider metals sector through the elimination of waste and increased efficiencies. This programme aims to:

- Deliver a research and innovation programme that will transform the productivity and environmental sustainability of the UK steel & metals sector, and supply chain.
- Support the government's ambition in driving the green recovery unleashing RD&I technologies for the steel and metals sector to deliver clean growth and help to achieve the overall target of investing 2.4% of GDP in UK R&D activity by 2027.
- Work with the UK steel and metals industry including the SME base and supply chain.

The PRISM programme will ensure that the UK steel and metal sectors have access to internationally accredited R&D technological support, it supports innovation in steel and metals through the application of digitisation, circular economy and net-zero enabling technologies. The programme is intended to enhance productivity levels and improve decarbonisation through the transformation of manufacturing processing which will help improve steel and metals competitiveness and will play a critical role in retaining the UK's steel sector and boosting the wider metals sector.

Find out more and apply for project funding and support –

<https://www.mpiuk.com/prism.htm>

Further Information on MPI at www.mpiuk.com or email - enquiries@mpiuk.com.

Transforming Foundation Industries Update



The 'Transforming Foundation Industries' ISCF challenge was announced at the COP24 climate talks in Poland. It will transform the UK's foundation industries to make them internationally competitive, secure more jobs throughout the UK, and grow the sector by 2024 in an environmentally sustainable way.

Foundation Industries produce materials such as metals, glass, paper, cement, ceramics and chemicals. They supply the majority of these to other wealth-generating sectors in the UK including construction, aerospace, automotive and packaging. They employ half a million people and account for around £50bn of economic value (gross value added, GVA). The UK steel industry is a large part of this: 1/5 of these people are employed within the steel industry or direct supply chains, £2.8bn of direct GVA contribution and £6.4bn contribution is through the supply chains.

These materials cannot realistically be replaced as part of the economy before 2050, and indeed are unlikely to be even within our children's lifetimes. As we move ever more rapidly towards both a net-zero carbon and sustainable future it is therefore imperative that these materials are produced in a more environmentally sound, but commercially viable, manner. The Transforming Foundation Industries (TFI) Challenge is designed to both stimulate and pull through the multi-sector innovations that are required to make this happen.

These industries have individually done much to improve their performance in recent decades. It is now clear though that in some key areas it will take their combined efforts to meet these challenges. TFI is therefore also designed to significantly increase the levels of cross-sector innovation being undertaken.

The programme covers the following investments, with £66m of government funding, and £83m of matched funding from industry, local governments, and other sources.



What has the first year seen?

Initial successes through the first year of the Challenge include a £15m contribution towards a £54m pilot facility, primarily for the glass sector, to allow disruptive R&D trials. But this will also allow the trial and development of advanced sensors, controls and heat recovery systems for use in all sectors.

£5m and £10.5m in project costs have been committed through the first two competitions, *Fast Start* with projects starting from July 2020 and *Resilient Recovery* with projects starting from February 2021. The Large Collaborative R&D competition closed recently, with an expected total commitment of above £10m on cross-sector projects focussing upon energy or resource efficiency.

A number of steel companies have been involved in the early projects, including *South Wales with Both Eyes Open* looking at Industrial Symbiosis in the South Wales region for use of waste heat or physical waste streams; a project looking at upgrading the value of BOS slag by addition of difficult to recycle glass or slags; the development of a novel EAF composite feedstock, produced through a cold process; the development of an on-line electromagnetic sensor array capable of on-line microstructural measurement of cooling steel to allow greater differentiation of product portfolios.

We are putting £4m toward supporting academics, business and government to work together and solve common challenges. This consists of providing a coherent Foundation Industries sector **identity**, to raise the profile of the sector and provide it with a voice to influence policy and engage in wider issues; **supporting** technology adoption by addressing social and economic barriers preventing innovation, addressing the future skills gap and promoting diversity; and **connecting** the foundation industries community together through our EPSRC Network+ community building programme and our KTN industry-led events.

What's still to come?

There are two further collaborative R&D competitions this year, the first aimed at SMEs in June, and the second in December looking to demonstrate transformational ideas in resource and energy efficiency on existing foundation industry lines. Look out for more information about both of those in the coming months at www.foundationindustries.org. We also have a series of training workshops taking you through the grant funding landscape, application process, and what other finance options you have following the grant funding.

The TFI Network+ is gaining momentum and has both a series of community building events, and the opportunity to apply for mini projects to evaluate new practices with the network's academics. Join the network and keep up to date by visiting [TFINetwork+ - Transforming the Foundation Industries \(tfinetworkplus.org\)](http://TFINetwork+ - Transforming the Foundation Industries (tfinetworkplus.org)). The following article provides further background on this network.

As ever, we are dedicated to supporting the sustainability of the foundation industries, and so are very happy to hear from you as to what we can do to help over the next few years.

*Dr Sarah Connolly MEng CEng MIMMM, Innovation Technologist at Innovate UK
Member of the Iron and Steel Society Board*

Transforming Foundation Industries Network+

In recognition of the global and national importance of the Foundation Industries, the Engineering and Physical Science Research Council has awarded £2M to create the Transforming Foundation Industries (TFI) Network+. The core aim of the network is to co-create and identify, in collaboration with stakeholders across all the Foundation Industries, innovative technologies and pathways for implementation, to enable transformation towards more sustainable practices, while improving performance. This will be achieved by coordinating and channelling a wide range of expertise throughout UK academia in themes such as energy and resources efficiency, circular economy, and next-generation processes.



The Foundation Industries (namely glass, ceramics, metals, paper, cement and bulk chemicals) are worth £52 billion to the UK's economy, produce 28 million tonnes of materials per year but account for 10 percent of the UK's total CO₂ emissions. In line with the Climate Change Act 2008, there is a need to reduce carbon emissions to 80 per cent below the levels that were seen in 1990 by 2050, and the recent COVID-19 induced stress on global supply chains demonstrates the importance of reuse and recycling in the manufacturing sector.

Each industry faces its own challenges and opportunities in reusing, recycling, and repurposing products and raw materials. Similarly, the need for digitisation, including real-time data capture and process modelling, has increased interest in AI (Artificial Intelligence) and technology to safeguard and improve effective work practices. Recent studies show that over a third of Foundation Industry businesses have introduced no new products or processes within the past three years, with risk, cost and regulations all contributing to reduced levels of innovation.

The TFI Network+ led by the University of Sheffield, in collaboration with the Universities of Leeds, Swansea and Manchester, will coordinate a unified UK wide approach to tackle these challenges by bringing together the expertise and best practice across the sector through participatory workshops and seminars, developing collaboration opportunities between stakeholders and world-class researchers. Launched in February 2021 with a successful virtual event attracting over 250 representatives from across the Foundation Industries, the Network+ has continued its activities including building up a community of stakeholders and connecting with leading businesses within the sectors.

The TFI Network+ is planning several significant activities in the coming months. The first workshop was held on 19 April and discussed existing roadmaps to transformation, exploring commonalities, priorities and barriers across the foundation industries. Also upcoming is the Webinar series, *Blue Skies, Green Future* (the first one was held on 12 April and the next follows on 12 May) with guest speakers on topics such as geopolymers, cold sintering and designing alloys through resource efficiency. These events will be recorded and available on the website to view after each webinar has taken place. Soon to be announced is the first call

for mini projects with members invited to submit applications for projects addressing major industry challenges and fostering strong collaboration between industry and academia.

Becoming a member of the Network+ allows applications to be submitted for the funding call. Members will also receive a regular newsletter to keep up to date with developments across the sector, including news, events and funding opportunities.

Visit www.tfinetworkplus.org to find out more and register to become a member.

Contact the network by email at tfinetworkplus@sheffield.ac.uk

SUSTAIN – Strategic University Steel Technology and Innovation Network



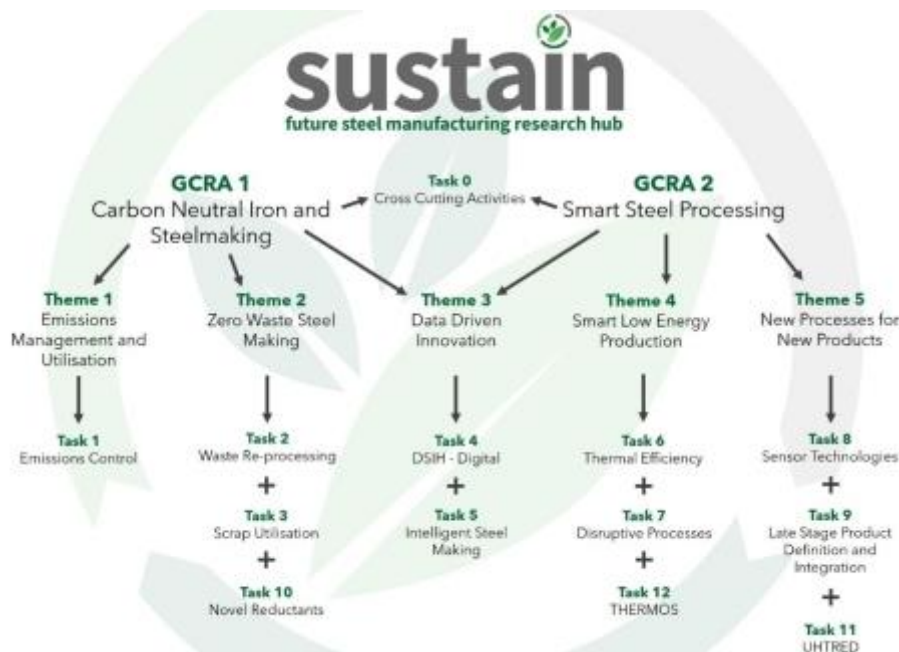
The SUSTAIN Future Manufacturing Research Hub is a £35m project funded by £10m of EPSRC funds together with the UK's leading Universities, Trade Bodies, RTOs and Businesses. Over its 7-year duration, the project aims to provide a scientific platform to launch new, more environmentally friendly methods to turn the steel industry and its supply chains 'green' and ensure the future of manufacturing in the UK.

SUSTAIN is led by Swansea University in a Hub-and-Spoke model with spoke partners University of Sheffield and Warwick Manufacturing Group, University of Warwick. Our strategic industrial partners include British Steel, Celsa Steel UK, Liberty Steel, Sheffield Forgemasters International and Tata Steel UK.

The SUSTAIN project aims to address two grand challenges:

Carbon Neutral Iron and Steelmaking – carbon neutrality and zero waste are the number one techno-economic challenge, so the projects in this Challenge area aim to create and commercialise solutions, influence policy and create opportunities for the circular economy within the supply chain.

Smart Steel Processing – by developing smarter processes for smarter products, the UK industry must supply a wider range of markets with high quality products. The projects in this Challenge area aim to investigate novel processes and use data driven approaches to deliver smarter solutions to industry.



Within these Challenges sit five themes containing our current projects:

- Emissions Management and Utilisation – capture and conversion of CO₂ into useful products such as fuels.
- Zero Waste Steelmaking – powering steel plants from waste material and developing a framework to allow for more efficient scrap reuse.
- Data Driven Innovation – developing business models for the entire steel supply chain and integrating smart systems for production, and maintenance of steel plants.
- Smart Low Energy Production – functionalising waste heat from steelmaking and investigating green hydrogen use.
- New Processes for New Products – using novel chemistries, processes and measurements to improve the efficiency and consistency of existing high value steels.

Over the last year, the hub has funded several new projects to align with these areas. Three feasibility studies have been funded at new partner academic institutions in the areas of *Ultra-High Temperature Reliable Electronics Development*, *Techno-economic Feasibility of Net-Zero Emission Solutions for Metal Heating* and *Drop-tube Furnace to Investigate Novel Reductants for the Decarbonisation of Ironmaking* at Durham, UCL and Cardiff Universities respectively. The Hub is also in the process of announcing the results from the recent Early Career Researcher Platform call, aiming to help those early on in their careers to develop bid writing and project management skills, alongside conducting novel research.

You can find out more about our projects, call announcements and upcoming events at www.sustainsteel.ac.uk. The hub is always looking for new projects and partners so please send us an email (info.sustainsteel@swansea.ac.uk) if you are interested in working with us.

Contact us

Any comments regarding the content or format of the Newsletter are most welcome. We are happy to consider short articles on technical or commercial topics for inclusion in future editions.

Please contact either Peter Morris (e - peter.f.morris@virginmedia.com)
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