

Great Britain

Mayerton: Sustainability Roadmap for a Greener Future

UNITECR 2023 took place in Frankfurt/DE in September 2023, providing a platform for industry leaders to discuss sustainable practices. There, Christopher Beckmann (CB), Managing Director of Mayerton Refractories, unveiled the company's ambitious decarbonization roadmap. Since joining Mayerton in 2003, Christopher has played a leading role in the firm's robust growth. refractories WORLDFORUM met with him to discuss Mayerton's target of achieving net zero by 2050 and the strategic steps the company is taking to get there.



Fig. 1 Christopher Beckmann

rwf: Can you tell us a little about Mayerton?

CB: Mayerton delivers refractory products and engineering solutions internationally. Established in 1991 and headquartered in Europe, we collaborate closely with metal makers in the iron, steel, and non-ferrous metals industries. We specialise in the production of carbon-bonded shaped materials for the steel industry, serving our valued customers across four continents with mainly converter (BOF), electric arc furnace (EAF), and ladle linings. We also offer refractories for hot metal ladles, torpedoes, degassers, AOD's and tundish parts.

Our mission is to be the best refractory partner for our customers; this means delivering

balanced linings, targeted output, and consistent quality. Over the last three decades, our dedicated team of metallurgists and ceramicists has worked with our customers to achieve record-breaking results, including increasing lining lifetimes, increasing ladle capacity and reducing installation times. Mayerton's products are designed in Europe and delivered from our own ISO Accredited site based in Liaoning/CN. We tailor our material selections and designs to meet the needs of each of our customers. Beyond supplying products, we provide a wide-ranging partnership to leading players in the high temperature industry.

rwf: Can you summarise Mayerton's sustainability goals?

CB: Mayerton is committed to achieve net zero by 2050. As a first step in the programme, by 2030 we are implementing actions to reduce Scope 1 and 2 emissions by approximately 80 % as well as working on our product formulations and with suppliers to reduce scope 3 emissions.

We are focused on reducing Mayerton's impact on the environment as well as that of our customers, whilst simultaneously increasing output and lowering costs.

rwf: How is Mayerton reducing its impact on the environment?

CB: Mayerton is actively implementing a comprehensive strategy to significantly reduce our environmental impact. We strive to make our processes "greener" by focusing on the areas of material selection, recycling, re-formulation and energy efficiency.

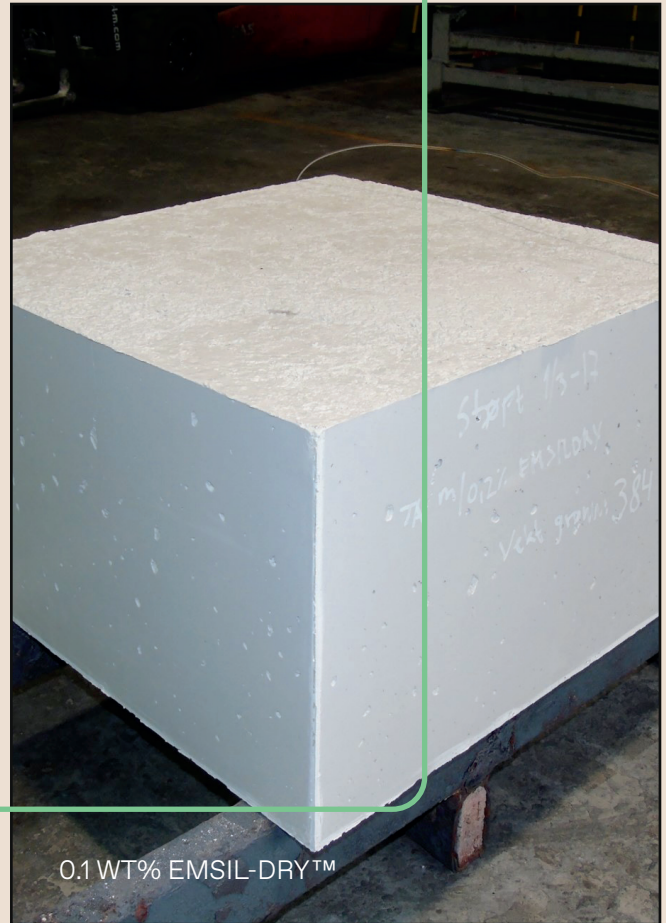
Recycling is one of our primary environmental initiatives. More than 80 % of our carbon footprint can be traced to the usage of raw material in our bricks. The fusion of ore in the manufacturing process is carbon-intensive; by increasing the content of recycled materials in our products, we can significantly reduce our carbon footprint.

Mayerton is developing new formulations with increased levels of reclaimed material without compromising product performance. We have already successfully formulated recipes with more than 50 % recycled material in our growing product range. Reformulation will use similarly less energy-intensive grades of magnesia.

Focused on our long-term goal of achieving net zero by 2050, Mayerton is investing in improving energy efficiency at our facilities. Take, for example, the heat generated in cooling areas is already being used to pre-heat bricks. We are exploring heating our offices through heat exchangers to reuse the heat from our ovens. An analysis of all heat sources is ongoing, accompanied by efforts to seal buildings and minimise heat loss, particularly during winter months.

Complementary efforts are also being made to reduce energy consumption and emissions, including the installation of LED lights in our manufacturing centre, the installation of solar panels on the factory roof and a switch from diesel-powered to electric forklift trucks.

rwf: How is Mayerton helping customers reduce their carbon footprint?



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Fig. 2 Electric Arc Furnace (EAF)

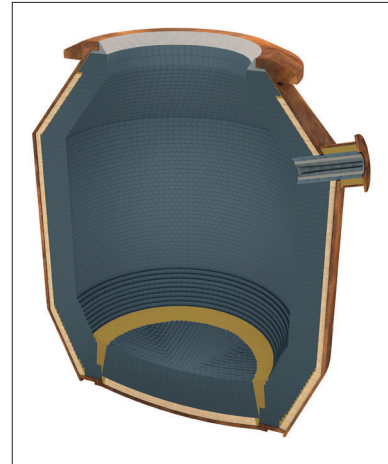


Fig. 3 Basic Oxygen Furnace (BOF)

CB: Mayerton is supporting customers to decarbonize the steelmaking process through our Sustainability Roadmap for a greener future. A key initiative for our customers is the reduction of the refractory CO₂ emitted per tonne of liquid steel.

We have developed advanced models that assess both the CO₂ emissions associated with raw materials and production of the lining, as well as the volume of steel produced through it, by factoring in performance-related aspects such as campaign life and vessel capacity changes. This comprehensive evaluation enables us to support our customers in achieving a more efficient and eco-friendly steelmaking process.

rwf: How can BOF steelmaking decarbonize?

CB: Carbon emissions can be reduced in basic oxygen furnace (BOF) steelmaking through technological enhancements and

operational optimizations. Mayerton is collaborating with BOF steel makers to support their efforts in this area. We enhance performance and boost capacity by carefully choosing materials, optimising lining design, and implementing best metallurgical practices. Our customers have seen impressive results from increasing campaign lives and increased capacity of their BOFs.

In Europe, we have collaborated with a key customer to increase BOF life by more than 35 % through ongoing lining design and material selection improvements. More recently, the vessel capacity has been increased by 10 %. The net result of this development process has been a 30 % reduction in tCO₂e/mt of lining delivered and 40 % reduction in tCO₂e/tLS contributed by the lining to the customer's process.

This is extended to ladles. We have enabled a reduced number of full ladle relines through extending ladle campaign life by increasing the number of slag-lines possible per campaign, further streamlining steel production. Fundamentally, BOF steelmakers can reduce emissions through greater efficiency and Mayerton provides the necessary support to do just that.

Working with a long-term customer, ladle life was extended over 25 % achieving a new plant record. This reduced the total refractory consumption, and hence reduced CO₂ emissions from our product by 5 %, while reducing reline downtime and increasing plant availability for sustained throughput.

While a lot of attention is on CO₂, we are also supporting other environmental initiatives. For example, we recently delivered a

low fume, no odour ladle lining solution to a customer. The performance of the lining matched the standard lining performance with strong results from the health, safety and environmental perspectives. The rate of demand for these types of materials across our international customer base is increasing. It is gratifying that Mayerton's teams saw this potential trend early enough to have done the development work allowing us to offer these solutions before the acceleration of this customer requirement takes off.

rwf: At UNITECR 2023 it was asserted that EAF will be the backbone of steel production for the next 25–30 years. Do you agree?

CB: Absolutely, I firmly believe that electric arc furnaces (EAFs) will play a pivotal role in the future of steel production. However, it is unlikely all BOFs will be replaced with EAFs – at least in the short term. There are certain steel grades that need to be produced from raw ores for quality reasons. At Mayerton, we are helping our customers shift from BOFs to EAFs. This shift poses a significant challenge, namely, maintaining high-quality steel. Leveraging our 30 years of experience with EAF mills, we are well-equipped to tackle this challenge.

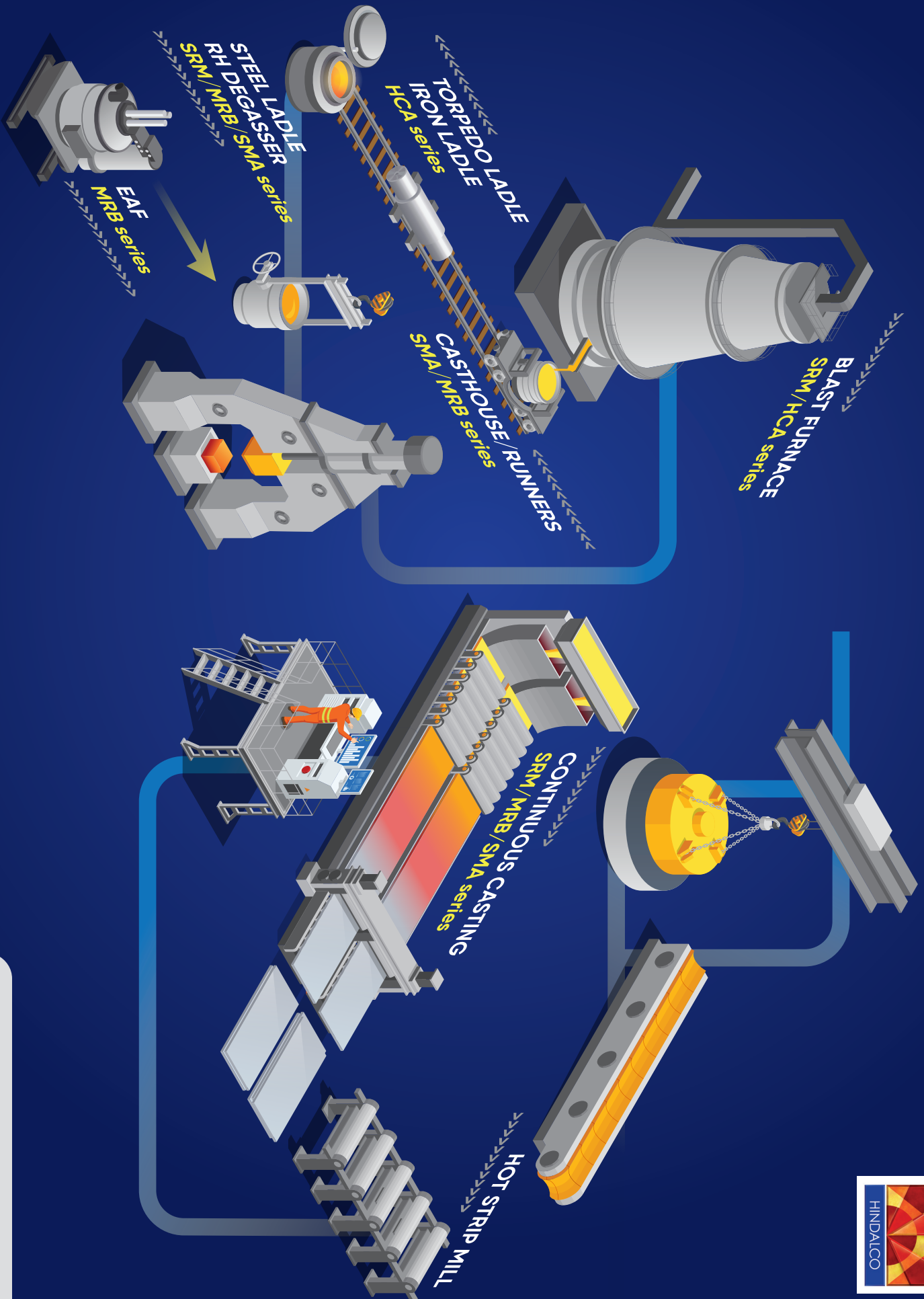
A BOF uses hot metal produced from high-quality iron ore, whereas an EAF utilises steel scrap. The presence of trace elements in scrap means that the scrap melting EAF process is not appropriate for all steel requirements; certain steel grades require manufacture from raw ore sources.

Whilst EAF production is focused on recycling rather than extraction and is more



Fig. 4 Steel casting ladle

Hindalco Alumina at every step in Iron & Steel LANDSCAPE



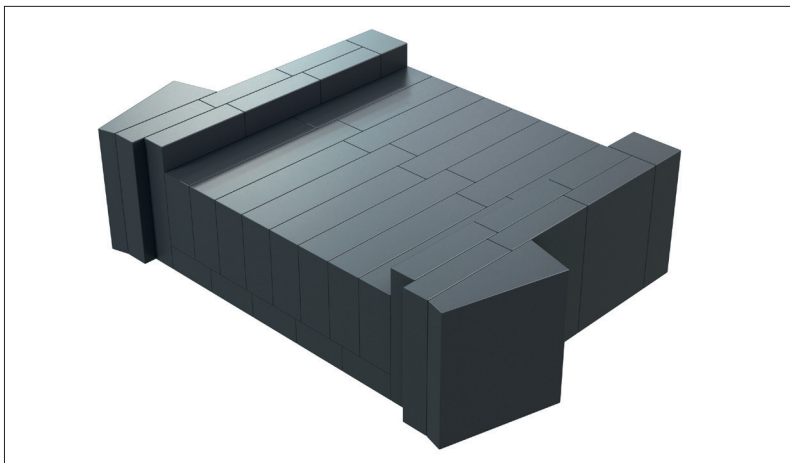


Fig. 5 Prefabricated slagdoor

sustainable, there are drawbacks. The use of direct reduced iron (DRI) as a processed raw ore source in EAFs is harsh on refractories, leading to higher wear and lower lifetimes. We collaborate with EAF shops to provide linings that meet their heat and lifetime targets for vessels. Our technical teams stand ready to support and work with our customers through this transition to develop new refractory solutions as the challenges become apparent.

rwf: *How can carbon emissions be reduced in EAF shops?*

CB: The main driver for the transition from BOF to EAF is the reduction of emissions associated with fossil fuel use in the iron making process. As renewable energy sources become more widely available to steelmakers, it makes the EAF process more attractive from an emissions perspective. The development of hydrogen reducing sources to replace natural gas further enhances this transition. As mentioned earlier, from a refractory point of view, this will

provide new challenges and require new solutions.

We gave a presentation here at UNITECR entitled “Prefabricated Slagdoor Solution – To Solve a Well-known Obstacle to Increase EAF Performance”. In that presentation, we outlined how increasing the life of the slagdoor balanced the refractory lining performance, enabling the complete EAF lining to fulfil its potential; hence reducing CO₂ emissions through lower refractory consumption.

rwf: *Are there any other innovations in refractory technology that can help steel makers reduce their carbon emissions and energy usage?*

CB: Certainly. We appreciate that reaching net zero requires new technological breakthroughs and we are increasingly ramping up efforts in this area, with tools like digitalization, digitization and AI.

Decarbonizing the steel industry presents challenges for refractory linings. Our technical team collaborates with steel makers to

find solutions. Mayerton’s focus is on optimising vessel lining concepts for balanced configurations and extended vessel life.

Our innovative designs, tailored to our customers’ needs, increase steel production, minimise maintenance, and produce less waste. With our help, one customer reduced the number of BOF linings required by 15 % a year, whilst maintaining steel output. This resulted in reduced tonnes of materials required, less downtime, and less waste.

rwf: *What role do logistics play when it comes to greater sustainability?*

CB: Logistics contribute to the overall carbon footprint of our business. In pursuit of greater sustainability, logistics play a notable role. Mayerton prioritises eco-friendly logistics solutions to minimise our environmental impact.

As ocean freight carriers move towards net-zero using alternative fuel systems, there will be significant reduction in the carbon footprint of our logistics. Similarly, as road hauliers decarbonize, potentially adopting hydrogen-based fuels, so will our final-mile logistics. It is key that the entire supply chain moves towards a greener future.

rwf: *Why do customers choose to work with Mayerton?*

CB: Our international customers choose to work with us for a variety of reasons: reliable customer service, high standards and innovative partnership.

With 30 years of reliable customer service, we have established enduring partnerships with steel mills across the world. Customers value our on-site support, including lining supervision, operational parameter monitoring and reviews, and installation supervision.

Headquartered in Europe and affiliated with the German Refractories Association (DFFI) we adhere to the highest standards. Our site in Liaoning, China is ISO accredited. With our design and engineering teams in Europe and manufacturing in China, we have access to innovative R&D and the highest quality raw materials.

Mayerton offers supportive, adaptable and forward-thinking partnerships. Our team is always asking, “what more can we do?” and arriving at new concepts to enhance refractory performance. From new design ideas to the streamlining of systems, our team is always pushing the boundaries of what is possible. For example, our techni-



Fig. 6 Slagdoor installed

cal sales team introduced a new system of labelling of bricks to speed up installation. This technique means that the bricklayers can have the vessel back in service sooner, improving the reline time resulting in additional steel production.

Our expertise lies not only in our knowledge and theoretical understanding but also in our practical skills. Mayerton's experts listen to the needs of metal makers to collaboratively improve the manufacturing process, increase output and reduce costs. The journey to sustainability is a great challenge, we help our customers rise to that challenge to achieve a greener future.

rvf: Thank you for talking to us. KS



Fig. 7 Mayerton team at METEC Trade Fair, Düsseldorf 2023

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