Issue March 2025

STEEL+ TECHNOLOGY

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THE TECHNICAL MAGAZINE FOR IRON AND STEEL PROFESSIONALS AROUND THE WORLD

ECONOMY

New US tariffs on steel imports a radical escalation of the trade war

METALLURGY

Advantages of vacuum tank degassing over RH process in electric steelmaking

STEEL TRADE

Asia-Pacific sustainable steel market analysis and forecast 2024-2034

STEEL APPLICATION

Heritage preservation with advanced steel skeleton for historic warship Vasa

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EU steel industry in trouble

Arnt Hannewald,
Dipl.-Ing., Editor

This issue begins with a strong statement from Eurofer President Dr Henrik Adam on the potential impact of the new US tariffs as a radical escalation of the trade war (see **page 20**). Eurofer expects them to further worsen the situation of the European steel industry, exacerbating an already disastrous market environment of global steel overcapacity and locally declining demand. This market situation is already having a significant effect. Henrik Adam says: "In 2024 alone, the EU steel industry had to close 9 million tonnes of capacity with over 18,000 job cuts announced." And he adds: "Without an immediate tightening of the current safeguard quota regime, the deflection provoked by the new U.S. steel tariffs will inevitably push EU steel capacity into additional idling and, ultimately, closure." Adam calls on the EU to take effective countermeasures such as CBAM effectiveness and simplification. What he does not say is that the European steel industry is in such a bad situation, partly because both the EU Commission and the governments of the member states have responded to the industry's urgent calls for help far too slowly and half-heartedly for far too long. What's more, politicians in Brussels and other European capitals are now more concerned with transatlantic and peace policy than with boosting the economy. It will therefore not be an easy year for European steel companies.

Coming right back to the technology, this issue again presents important trends that are directly related to the shift from the BF-BOF route to the DR-EAF route. In terms of secondary metallurgy, the advantages of vacuum tank degassing in comparision to the RH process are highlighted (see **page 34**). This is followed by five articles covering with different aspects of the climate-friendly manufacturing of flat steel products.

Our Steel Distribution section (see **page 53**) is dedicated to green steel – from the delivery of steel products by electric truck to the demand for green flat steel products in Finland and the market trends for sustainable steel in the Asia-Pacific region. The Steel Processing and Application section (see **page 60**) is also all about green steel – for roofing solutions, steel towers for wind turbines and more. Last but not least, the historic warship Vasa will be supported and stabilised in its museum by a unique steel skeleton. Steel preserves heritage through innovation (see **page 64**).

European steel has a lot of potential, but this year it needs all the support it can get.

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PLANTS

GENERAL COUNSEL OF SANDVIK ANNOUNCES TO LEAVE THE GROUP

Åsa Thunman, Executive Vice President and General Counsel of Sandvik, has decided to leave Sandvik for a corresponding position at the Swedish project development and construction group Skanska.

Åsa Thunman, who has been in her current position and a member of the group executive management since 2014, will leave Sandvik no later than in July 2025. A recruitment process to find a successor has been initiated. "Åsa Thunman has been a highly appreciated colleague, and she has made strong contributions over the years in developing our legal organization and as a member of the group executive management. I wish her all the best for the future as she now moves on to new challenges outside Sandvik," says Stefan Widing, President and CEO of Sandvik.

Sandvik AB

CREMER ERZKONTOR APPOINTS REGIONAL AND COUNTRY MANAGERS IN THE AMERICAS

Chris Edkins is the new Head of North America (Picture: Cremer Erzkontor)

In January 2025, Rafael Rivera took over as the Managing Director of Cremer Erzkontor México (Picture: Cremer Erzkontor)

Chris Edkins has been appointed Head of North America, and Rafael Rivera the new country manager Mexico of end-to-end raw materials supplier Cremer Erzkontor.

Chris Edkins joined Cremer Erzkontor almost a year ago as Managing Director USA. In his new position, he will be part of the international management team. "With Chris Edkins, we have gained an experienced, native expert on the American market who will drive the strategic expansion of our business in North America," said Roberto Wurst, Executive Director of the company. Edkins succeeds Niklas Lüdemann, who assumed the role of Head of Business Development.

In his role of Managing Director of Cremer Erzkontor México, Rafael Rivera will play a key role in driving forward the strategic development of the Mexican market. "The Mexican market offers great potential and I look forward to developing it together with the Cremer Erzkontor team," says Rafael Rivera of his new role. "

Cremer Erzkontor, headquartered in Lübeck, Germany, has offices on five continents. The company is active in international trade, processing, recycling and logistics in raw materials and chemicals, with the sales focus on all European countries, North and South America, Africa, and Asia.

Cremer Erzkontor

NUCOR EXECUTIVE VICE PRESIDENT GREGORY J. MURPHY TO RETIRE

Gregory J. Murphy, Executive Vice President of Business Services and General Counsel of Nucor Corporation, plans to retire effective June 7, 2025 following a 36-year career. He will transition out of his current responsibilities on March 9, 2025, when Benjamin M. Pickett will be promoted to Executive Vice President of Business Services and Douglas R. Wilner will be promoted to President of Corporate Legal Affairs and General Counsel. Over the next several months, Greg Murphy will continue in his Executive Vice President capacity as an advisor to Leon Topalian, Nucor's Chair, President and Chief Executive Officer, and will work with Messrs. Pickett and Wilner to ensure a seamless transition.

Nucor

NEW HEAD OF SSAB EUROPE

Tony Harris has been appointed new head of SSAB Europe effective February 1, 2025. In this new role, he is also a member of SSAB's group executive committee. Since joining SSAB in 2014, following the merger with Rautaruukki, Tony Harris has served as a key member of SSAB Europe's management team. He transitions into this role from his current position as head of sales and business development at SSAB Europe. Tony Harris succeeds Olavi Huhtala, who earlier has announced his retirement.

SSAB

Tony Harris has been appointed head of SSAB Europe (Picture: SSAB)

KOUSHIK CHATTERJEE NEW SUPERVISORY BOARD MEMBER AT TATA STEEL NETHERLANDS

Dr. Henrik Adam has stepped down as member of the Supervisory Board of Tata Steel Netherlands as of January 29, 2025. At the same date, he was succeeded by Koushik Chatterjee, who currently holds senior positions in the Tata Steel Group, including Executive Director and Chief Financial Officer of Tata Steel Ltd and Member of the Board of Tata Steel UK. The other members of the Board of Tata Steel Netherlands are T. V. Narendran (Chairman), Herman Dijkhuizen and Claudia Zuiderwijk.

The Management Board of Tata Steel Netherlands consists of Hans van den Berg (CEO), Hans Turkesteen (CFO), Tom Eussen (Managing Director Tata Steel IJmuiden and Downstream), Gunilla Saltin (Managing Director Tata Steel Downstream Europe) and Akash Latchman (Chief Project and Engineering Officer).

Henrik Adam will continue in his role as Executive Chairman of Tata Steel Netherlands Holdings B.V. with a focus on European affairs and as an advisor to the CEO & Managing Director of Tata Steel Ltd, T. V. Narendran.

Tata Steel

STEEL FOR PACKAGING EUROPE ELECTS NEW PRESIDENT

Steel for Packaging Europe has appointed Richard Lézé, chief marketing officer of ArcelorMittal Packaging Europe, as the association's new president. He succeeds Luc Brantjes of Tata Steel.

Commenting on his appointment, Richard Lézé said: "The months ahead are set to be among the most important in recent years for the industry, our association and its members. The adoption of the Packaging and Packaging Waste Regulation (PPWR) has intensified the EU's focus on industry competitiveness, in addition to highlighting the critical need to align growth with sustainability and innovation." Steel for Packaging Europe, formerly known as APEAL, represents the five major European producers of packaging steel.

Steel for Packaging Europe / ArcelorMittal Europe

HEAD OF SSAB AMERICAS ANNOUNCES RETIREMENT

Chuck Schmitt, head of SSAB Americas, has announced that he will retire in the summer of 2025. A recruitment process to find his successor has begun.

Chuck Schmitt has been head of SSAB Americas and a member of SSAB's group executive committee since 2011. He has been with the company since 1990, starting at the U.S.-based IPSCO which was later acquired by SSAB. "I am extremely proud of the SSAB that we have built and the success we have created together," says Chuck Schmitt. "We have a strong financial position, an industry-leading safety performance and we are at the forefront of innovation and the green transformation. I now look forward to sharing more time with family but will continue to follow SSAB's journey and my friends and colleagues from a distance."

SSAB

STEGRA APPOINTS HEAD OF OPERATIONS IN BODEN

Stegra has appointed Niklas Wass as head of operations in Boden, starting April 1, 2025. Wass joins the company after 22 years at stainless steelmaker Outokumpu.

Stegra was founded in 2020 as H2 Green Steel. The company is in the process of building its first plant for large-scale production of green hydrogen, green iron and green steel in Boden, northern Sweden.

"Few people can match Niklas' experience from electric arc furnace-based stainless-steel operations. We are very glad to have him on board," says Henrik Henriksson, CEO, Stegra. Wass succeeds Markus Mannström, who will take on a new role in Stegra as head of transition office, focusing fully on coordinating and supporting the transition from the construction phase to start of production in Boden.

Stegra

SSAB FILLS NEW POSITION IN GROUP EXECUTIVE COMMITTEE

SSAB has appointed Helena Norrman as Executive Vice President & Head of Group Communications, a newly-created role in the company's group executive committee. Helena Norrman joins SSAB from her role as partner and communications advisor at global communications consultancy Kekst CNC. Prior to this, she held several leading positions at global telecom company Ericsson, where, for example, she headed marketing and corporate relations and was a member of the company's executive team.

SSAB

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EUROPE – GERMANY

Rogesa optimizes durability and wear monitoring of blast furnace

Rogesa Roheisengesellschaft Saar GmbH in Dillingen has commissioned SMS group to carry out a comprehensive modernization of blast furnace 4. The contract includes the planning and delivery of the Paul Wurth hearth lining and multi thermocouple sensor probes.

Blast furnace 4 at Rogesa will undergo a major upgrade this year (Photo: SMS group)

Blast furnace 4, built in the late 1970s, was enlarged and relined by Paul Wurth in 2003. It has a usable volume of 2,460 m³ and an output of 6,400 t/day. The last reline took place in 2016.

The upgrade is based on measurements taken in 2023, which indicated that the wear on the hearth of blast furnace 4 is more advanced than expected, and that the remaining wall thickness is approaching the wear limit.

The new lining will extend the service life of the blast furnace and ensure effective monitoring of the hearth lining. SMS plans to use Paul Wurth hearth lining technology, including carbon blocks, ceramic cups, and refractory materials, which are known for their durability and reliability. Well-designed equipment offers exceptional thermal insulation by maintaining the extremely high temperatures required for iron ore reduction. In addition, it offers corrosion resistance by avoiding chemical attacks from molten iron and slag, and structural support by withstanding mechanical stresses and maintaining the furnace's shape. The multi thermocouple sensor probes are designed to precisely determine and track hearth lining wear, thereby ensuring enhanced monitoring and operational efficiency. The project is expected to be completed in the third quarter of 2025, with a shutdown time of only 55 days.

SMS group

ESF Feralpi Stahl scores new production record

With an average throughput of 180 tonnes per hour and peaks of 190 tonnes per hour in hot-charge mode Feralpi Stahl achieved an impressive production record at its bar and wirerod mill "Walzwerk A" in Riesa.

This performance was made possible by Danieli equipment, such as the billet welder supplied in 2022 and hot-charging equipment installed in January 2024. The continuously welded billets are fed at high rates into the bar and wirerod mill supplied by Danieli in 1994.

Danieli

EUROPE – FINLAND

Outokumpu updates estimates on mineral reserves

Outokumpu has updated its estimates on the mineral reserves and mineral resources of the Kemi chrome mine in Finland. The 95% increase in the mineral reserves is based on new underground drillings. Chrome ore is further processed into ferrochrome, which is a crucial raw material for stainless steel making.

These drillings have proved that the ground at the mine area is rich in chrome ore, which extends the life of the Kemi mine substantially. The proved mineral reserves have significantly increased compared to earlier estimates and are now approximately 62.5 million t instead of the earlier estimate of 32.1 million t.

Mineral reserves refer to the quantity of natural resources that are established using geological and engineering data gathered through diamond core drilling. Mineral resources refer to resources that have been identified but have a lower level of geological and economic confidence, requiring further exploration and assessment to be upgraded to reserves. Classi-

fication is done in accordance with the PERC Reporting Standard.

Outokumpu has recently completed a significant expansion project at the mine, deepening the underground mine from 500 m to 1,000 m, and switching to new, highly automated ore handling and hoisting systems. These steps secure the availability of chromium until the 2050s, and no further major investments are needed to benefit from the increase in mineral reserves.

Outokumpu

Blastr Green Steel completes next partner financing round

Blastr Green Steel has successfully completed a second strategic partner financing round, advancing the development of a European integrated ultra-low CO_2 steel value chain with its flagship steel plant in Finland.

The partner financing round included three of Blastr's founding investors and three new investors based in Finland. The new investors are: Aurora Infrastructure, a company providing industry-leading solutions for asset financing, transfer and development of existing or new electricity networks in the Nordics; Onvest Oy, a family-owned company and partner, and enabler of sustainable growth; and Security Trading Oy, a family investment company focused on creating a more sustainable, resilient future.

The original investors providing additional capital and increasing their ownership in Blastr are the global steel industry player Cargill, Finland's state-owned venture capital and private equity investment company Tesi, and Blastr's founder Vanir Green Industries.

The proceeds of the closing will be used to progress Blastr's value chain with the steel plant in Inkoo, Finland, and further development of Blastr's pellet plant that will produce 6 million t of DR pellet feedstock annually. Blastr is creating a low-carbon mine-to-gate steel value chain with significantly lower CO_2 emissions than conventional steelmaking by using hydrogen instead of coal in the iron production process and feedstock made with carbon-free energy. This mine-to-gate model enables a differentiated and profitable business model with a low carbon footprint.

Blastr

EUROPE – FRANCE

Rio Tinto and GravitHy join forces to accelerate decarbonisation of steelmaking

Rio Tinto has entered into definitive agreements to help accelerate GravitHy's steel decarbonisation project in France. Rio Tinto will supply high-grade direct reduction iron ore pellets from its Iron Ore Company of Canada operations and manage the sales and marketing of ultra-low carbon hot briquetted iron GravitHy produces.

GravitHy's proposed two million tonnes per year iron production facility at Fos-sur-Mer is planned to be commissioned in 2028. The facility, which is located next to a deep seaport, will feature ultra-low carbon hydrogen production infrastructure, powered by existing grid-connected nuclear power, to process direct reduction pellets into HBI. Steel produced with low-carbon emissions is an essential component of the net-zero energy transition. GravitHy Chief Executive Officer José Noldin said: "We are developing one of the most advanced ultra-low-carbon iron projects worldwide, designated by the French government as an 'industrial project of major national interest'. By combining our business ambitions, agility, and technological capabilities with Rio Tinto's global leadership in mining and steel decarbonisation, we are ensuring a solid sourcing and go-to-market strategy to help accelerate the development of this project."

Rio Tinto

EUROPE – GREECE

Sovel to upgrade bar mill

Greek steelmaker Sovel has awarded Danieli Automation the order to modernize the entire electrical and automation system of its bar mill in Almyros, Magnissia.

The aim of the project is to increase production safety, stability and reliability by replacing obsolete hardware equipment with new and modern Danieli Automation devices and advanced process controls.

The mill is a single-strand bar rolling mill with slitting in a single line for medium bar diameters, and a double line with fast-finishing blocks, quenching, tail breakers and double twin channels for high-speed production of smaller sizes. The project complies with the European Machine Directive and will be implemented by August 2025.

Danieli

EUROPE – ITALY

Trafilix starts up new drawing machine

Trafilix, member of the Lucefin group, has brought on stream its new high-speed chain-track drawing machine supplied by Danieli Centro Maskin.

Safely housed high-speed chain-track drawing machine in operation (Photo: Danieli)

The machine, in operation at the Trafilix production site in Brescia, has a pulling capacity of 5 t and is used to produce round, square, and hexagonal solid bars starting from wirerod. Danieli Centro Maskin chain-tracks provide optimal quality surfaces, high drawing speed (up to 200 m/min with ferrous materials) and unparalleled efficiency, along with high-precision process control.

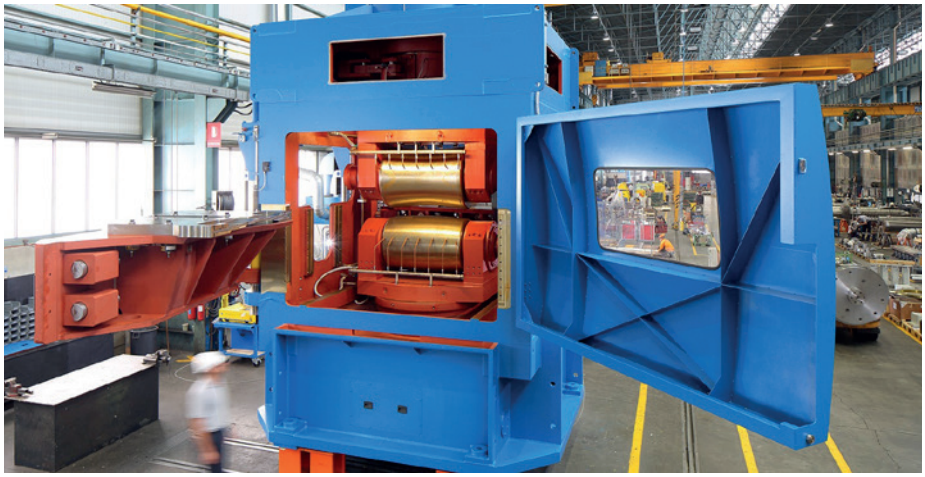
The new unit for Trafilix complies with Industry 4.0 protocols and is ready to be integrated with the latest generation of Danieli digital systems. Danieli manufactured the technological equipment in its specialized workshops at the headquarters in Buttrio.

Danieli

EUROPE – ITALY

Acciaierie Venete orders EAF and new straightening line for bar mill

Acciaierie Venete is making major investments in equipment for its Padova works. The orders for the supply of a new 100 t electric arc furnace and new straightening line for large bars have been placed with Danieli.



Acciaierie Venete will use the new straightener for the processing of up to 200-mm-dia SBQ material. (Photo: Danieli)

The new electric arc furnace will allow Acciaierie Venete to produce approx. 750,000 t/year of high-quality, green, engineering steels. It will be equipped with technological packages designed for fully automated operation ensuring a high level of safety and low dust and noise emissions. The furnace will be equipped with the Danieli-patented digital electromagnetic stirring system, which enhances the homogenization of the liquid steel temperature and chemistry to improve operational efficiency. Danieli will provide equipment, automation and installation for this brown-field project by summer 2026, within a scheduled six-week shutdown, followed by a quick ramp-up.

The second supply will consist of a fully automated, high-productivity straightening line to process SBQ black bars of up to 200 mm in diameter and a maximum yield strength of 1,350 N/mm². The unit will be in compliance with Industry 4.0 and ready to be integrated with the latest generation of Danieli digital systems, such as condition monitoring, at any time. Through the monitoring and analysis of the data acquired by the various sensors installed on the line, it will be possible to improve overall process efficiency, eliminate unplanned maintenance, optimize spare parts procurement and related investments.

Danieli

Ten offers received for purchase of ex Ilva plants

By the deadline set at midnight on Friday 10 January 2025, the extraordinary commissioners of Acciaierie d'Italia (in extraordinary administration) had been received ten offers for the acquisition of the ex Ilva plants. The deadline, previously extended to December 2024, allowed for wider participation in the bidding process.

Among the offers received, there are three for all business complexes. These were a consortium comprising Baku Steel Company CJSC and Azerbaijan Investment Company OJSC, the American investment fund Bedrock Industries Management, and Jindal Steel International. There are seven offers interested in individual assets. These are CAR Segnaletica Stradale + Monge & C. + Trans Isole; Eusider; Eusider in a consortium with Marcegaglia Steel + Profilmec; I.M.C.; Marcegaglia Steel; Marcegaglia Steel + Sideralba, and Vitali. Although the deadline is not to be considered peremptory, any proposals that may arrive subsequently will be evaluated exclusively if they present particularly favourable conditions for the procedure in progress. During a suitable period of time all the proposals received will be carefully examined, with particular regard to employment aspects, decarbonisation and the size of investments.

Acciaierie d'Italia

EUROPE – SPAIN

Celsa reaches agreement for sale of subsidiaries

Grupo Celsa has reached an agreement with Sev.en Global Investments for the sale of 100% of its subsidiaries in the United Kingdom and in the Nordics.

Sev.en Global Investments is a Czech-based investment group that invests in a variety of sectors, with a focus on power generation and mining of natural resources. Grupo Celsa will devote all the funds received after the divestment to the reduction of Grupo Celsa's indebtedness in accordance with the legally assumed commitments.

Through this divestment, which is added to the recent increase in share capital and the launch of an ambitious efficiency plan, Grupo Celsa continues with the implementation of its plan to reorganize its industrial and financial situation, focusing on its operations in Spain and on the reduction of financial leverage.

Celsa

EUROPE – SWEDEN

Ovako to modernize bright bar facility

Mikael Haraldsson (l.), Tomas Andersson; Hofors-Hällefors (Photo: Ovako / R. Paulsson)

Ovako is carrying out a major modernization project at its main bright bar facility in Hällefors over a three-year period, from 2024 to 2026. The modernization will improve production efficiency and quality, and secure the company's long-term competitiveness.

In the summer of 2024, Ovako upgraded its operations with new cutting, chamfering, and milling equipment. The state-of-the-art machinery replaces older equipment and allows Ovako to handle all machining in-house, reducing unnecessary handling and transportation risks.

Building on the 2024 upgrades, Ovako has approved a major investment in a new peeling lathe, set to be operational in 2026. This will expand the product range, allowing Ovako to offer diameters of up to 130 mm. By modernizing its peeled bar operations, the company also aims to reduce internal transportation, enhance efficiency, and lower its environmental impact.

Ovako

GreenIron selects automation and control systems to scale up its operations

GreenIron has selected ABB to provide automation and control system solutions for a first commercial facility of its hydrogen-based reduction technology in Sandviken, Sweden.

GreenIron's reduction technology based on hydrogen will be industrialized for fossil-free and energy-efficient production of metals, producing fossil-free sponge iron that can then be used in industries such as steelmaking. By producing valuable raw materials from residual products such as landfills and residues as well as virgin ore, GreenIron paves a way for circular production processes. The integration of the ABB Ability™ System 800xA® distributed control system (DCS) will enable the scaling up of GreenIron's operations. This automation platform will manage the entire industrial process, with the capabilities to integrate control, safety and power management into one system. It will mean overall plant visibility for optimizations, efficiencies and better decision making based on data and insights. ABB and GreenIron's technologies are compatible with renewable, intermittent power sources like solar and wind. The goal is to contribute to the creation of a CO_2-free value chain, from the extraction of ore to the production of steel and various metals.

GreenIron / ABB

EUROPE – SWEDEN

SSAB receives environmental permit to transform Luleå steel plant

SSAB has received the necessary permit to build and operate a mini-mill in Luleå that will replace the current steel plant. The permit will enable a technology shift that will have significant positive effects on the environment and the climate.

Illustration of the future mini-mill in Luleå (Photo: SSAB)

"This is a big day for us at SSAB and for the transformation to fossil-free steel production in Sweden. Now we can proceed with an investment that will result in reduced climate impact of national significance. At the same time, we safeguard jobs in Luleå, create a more flexible and cost-effective production and strengthen our and our customers' competitiveness with a wider offering of unique premium products," says Johnny Sjöström, President and CEO at SSAB.

The plan is to decommission the current blast furnace-based production system once the mini-mill with electric arc furnaces, rolling complexes and further processing is running at full capacity. The investment will strengthen SSAB's leading position in the green transition of the steel industry, with a focus on special and premium steels produced with close to zero fossil carbon emissions. The investment will lead to a better cost position, higher efficiency, shorter lead times and eliminate CO_2 costs. The mini-mill will run on fossil-free electricity and be supplied with a mix of fossil-free sponge iron produced with the Hybrit technology (hydrogen reduction of iron ore) and recycled scrap as the raw material.

SSAB

EUROPE – SWEDEN

SSAB and Stena Metall partner on deliveries of scrap metal

Deliveries of recycled scrap metal under the agreement will primarily take place by train (Photo: SSAB)

SSAB and Stena Metall have entered into a strategic cooperation agreement that ensures deliveries of recycled scrap metal from the Stena Nordic Recycling Center in Halmstad to SSAB's new electric arc furnace in Oxelösund.

The collaboration means that a larger amount of recycled metal can be reused in Sweden, further strengthening the value chain for steel production with minimal carbon dioxide emissions.

The first deliveries are planned in connection with the ramp up of the new electric arc furnace. Deliveries will primarily take place by train between Halmstad and Oxelösund. SSAB plans to convert its entire Nordic production system to produce steel with virtually zero fossil carbon emissions while also increasing the share of premium products. SSAB in Oxelösund is the first site to embark on this transformation, with startup of the new production system planned toward the end of 2026.

SSAB / Stena Metall

EUROPE – TURKEY

First edition of wire and Tube Eurasia meets with great response

With 210 exhibitors on a total area of 8,000 square metres, the premiere of the joint trade fair of Wire TECH Istanbul, Tube & Steel Istanbul and wire and Tube Eurasia fully met the organizers' expectations.

In total, more than 10,000 customers from Turkey and neighbouring countries took the opportunity to learn about latest innovations and trends in the industries. "A promising start to the premiere in Istanbul," said Bernd Jablonowski, Executive Director of Messe Düsseldorf. In 2025, wire and Tube Eurasia will take place for the second time at the Istanbul fair grounds, showcasing technology competence from key industry players.

With wire and Tube Eurasia, the global network of satellites in Messe Düsseldorf's wire, Tube & Flow Technologies portfolio continues to grow. This year, satellites will be held in China, Egypt and Thailand.

Messe Düsseldorf

EUROPE – UKRAINE

Metinvest suspends operations at coal mine

Metinvest has suspended operations at Pokrovske Coal due to the evolving frontline conditions, power supply shortages and the deteriorating security situation.

Because the safety of employees is a priority for Metinvest, the group has facilitated the evacuation of employees of Pokrovske Coal and their families. For those not involved in the suspension process, the group is offering paid retraining opportunities and employment at other Metinvest assets in Zaporizhzhia, Kamianske and Kryvyi Rih. The full impact of this suspension on the group is currently being assessed. Metinvest's management is implementing an emergency action plan to ensure the supply of essential raw materials for steel production at the group's metallurgical assets Kamet Steel and the Zaporizhstal joint venture.

Metinvest

EUROPE – SWITZERLAND

Steeltec concludes consultation process

Steeltec, the production site of Swiss Steel Group, has successfully concluded the consultation process to explore all possible options to address the company's economic challenges and secure a sustainable future for the site in Emmenbrücke.

The consultation process, initiated in mid-November 2024, was conducted transparently and in close cooperation with the employee committee, the social partners, and the relevant authorities. As previously announced, a total number of 130 positions will be reduced in Emmenbrücke. Measures such as leveraging natural attrition and adjustments to organizational structures contributed to reducing the number of redundancies to a maximum of 50 employees. The existing social plan will apply.

Regardless of the above, the political decision enabling a temporary reduction in grid charges for the steel and aluminium industries was discussed during the consultation process. As previously communicated, Swiss Steel Group and Steeltec appreciate the Swiss National Council's commitment to the steel and aluminium industries in Switzerland and take note of its decision based on the currently available information.

Steeltec

EUROPE – UNITED KINGDOM

Binding Solutions upgrade R&D capabilities

Binding Solutions Limited (BSL), developer of green steel technology, has announced the completion of significant upgrades to the R&D capabilities at its technology centre in Middlesbrough, UK.

Binding Solutions Limited is now able to accelerate the commercialization of its cold agglomerated pellet technology by offering clients an enhanced range of research, technical support and product testing services significantly reducing development timelines. Following the commissioning of the first phase of BSL's pilot plant in November 2023, the company has now completed the commissioning of the second phase of the plant. The phase two expansion increases the pilot plant's capabilities through the integration of an ore drying system, milling plant, and pellet curing system. These additions significantly expand BSL's processing capabilities, enabling the pelletization of a wider variety of ores. In addition, new state of the art hot testing equipment has been installed and commissioned at the technology centre. BSL can now simulate conditions in direct reduction plants and blast furnaces to ensure its products meet customer requirements.

Binding Solutions Limited

DISTORTIONS IN GLOBAL STEEL MARKETS

US tariffs on steel imports a radical escalation of the trade war

The European Steel Association (Eurofer) has strongly condemned the new steel tariffs. It expects that they will further worsen the situation of the European steel industry, exacerbating an already disastrous market environment. Safeguard measures and improvements to the EU's Carbon Border Adjustment Mechanism (CBAM) are urgently needed to support the steel industry.

Eurofer President Dr. Henrik Adam is outraged. He uses harsh words: "The Executive Order signed by U.S. President Donald Trump imposing a 25% blanket tariff on all steel imports is a radical escalation of the trade war launched under his first administration. It will further worsen the situation of the European steel industry, exacerbating an already dire market environment."

European steel producers had exemptions under the current implementation of Section 232, and the European Commission had negotiated a Tariff Rate Quota (TRQ). Despite exemptions and the Tariff Rate Quota, EU steel imports in the U.S. decreased by over 1 million tonnes per year.

The European Steel Association estimates that the EU could lose up to 3.7 million tonnes of steel exports to the US if all product exclusions and TRQs are now removed. The U.S. is the second biggest export market for EU steel producers, representing 16% of the total EU steel exports in 2024. Losing a significant part of these exports cannot be compensated by EU exports to other markets.

"Additionally, this move risks causing new, significant trade flow deviations," says Adam. "In 2024, the U.S. imported about 23 million tonnes of steel products from third countries other than the EU. These volumes are now likely to be massively diverted into the European market."

Already today global steel overcapacity is being off-loaded massively on the vulnerable EU steel market at very cheap prices, mainly from Asia, North-Africa and the Middle East. This is leading to the inability to invest in the green transition and ultimately de-industrialisation of Europe. Henrik Adam: "In 2024 alone, the EU steel industry had to close 9 million tonnes of capacity with over 18,000 job cuts announced. The Executive Order by President Trump will inevitably further exacerbate the situation. The need for decisive EU action to preserve the European steel industry becomes even more urgent. Key measures we are expecting from the EU are:

Dr. Henrik Adam, Eurofer President
(Photo: Eurofer)

- The revision of the current EU safeguard regime with impactful measures as a matter of urgency to reflect the dramatic market and trade conditions. The EU safeguard was set up to contain the deflection caused by the first Section 232 action in 2018, but over the past six years, the safeguard has lost its effectiveness due to the increase of quota in the face of decreasing demand, by allowing imports to gain significant market shares in the EU.
- The continuation of a comprehensive tariffication system as an absolute necessity, as the current EU safeguard measure will terminate in less than a year and a half (end of June 2026) while global steel excess capacity is worsening and steel protectionism is increasing worldwide. It is important to note that WTO rules do not prohibit comprehensive tariffication as such.

Without an immediate tightening of the current safeguard quota regime, the deflection provoked by the new U.S. steel tariffs will inevitably push EU steel capacity into additional idling and, ultimately, closure."

CBAM effectiveness and simplification need to be combined

Following the high-level conference "A Carbon Border Adjustment Mechanism for Climate – Addressing carbon leakage to strengthen global climate action" organised by the European Commission and the French Ministries of Finance, Economy and Climate Transition in Paris on 12 February 2025, Eurofer stresses that simplification must go hand in hand with ensuring the effectiveness of the instrument. This means addressing key issues such as reshuffling of resources, exports and the inclusion of products further down the value chain.

Alarmingly, during the conference, the Commission announced that legislative proposals on crucial aspects of the Carbon Border Adjustment Mechanism (CBAM), including exports provisions and coverage

> Without immediate tightening of the current safeguard quota regime, the deflection provoked by the new U.S. steel tariffs will inevitably push EU steel capacity into additional idling and, ultimately, closure.
>
> *Dr. Henrik Adam, Eurofer President*

of downstream sectors, will only be presented at the beginning of next year. Furthermore, a top priority for securing steel decarbonisation investments in Europe – which is tackling resource shuffling – is currently not event listed in the Commission's planning of upcoming legislative proposals.

This situation contradicts the clear political guidance and sense of urgency expressed by both French Ministries during the conference and supported by other member states.

Improvements are urgently needed to enable steel decarbonisation investments in Europe

Eurofer is concerned about the differing timelines allocated to the simplification and effectiveness of CBAM. While the Commission is fast-tracking simplification through the Omnibus Package, the European steel industry remains deeply worried about the lack of urgency in ensuring CBAM's effectiveness.

This year's review of CBAM is critical to achieving both objectives. To ensure its effectiveness, a watertight design is needed. This urgently requires major improvements, including:

- Introducing a structural legislative solution to the very high risk of resource shuffling;
- Introducing a structural solution to preserve European exports, thus avoiding carbon leakage on global markets;
- Extending the CBAM's scope to steel-intensive downstream products.

Additionally, other design elements – such as stringent default values and the free allocation adjustment – must uphold the mechanism's environmental integrity.

If these adjustments are not implemented this year, the combination of CBAM and the scheduled phase-out of free allocation will fail to provide adequate protection against carbon leakage. This could further incentivise the relocation of production to third countries, negatively impacting both steel and downstream sectors.

While pursuing the effectiveness and environmental integrity of the mechanism, the administrative burden on operators should be minimised through simpler and streamlined procedures. The Commission has already planned certain simplifications as part of the Omnibus revision. In particular, a revision of the current de minimis threshold of €150 could be an appropriate adjustment to avoid unnecessary reporting for small consignments. Furthermore, CBAM reporting obligations should not apply to European products exported outside the EU, processed abroad, and subsequently reimported into the EU as CBAM goods. Effective monitoring should prevent such provisions from favouring circumvention practices.

In line with these recommendations, a more effective yet simpler CBAM is both possible and urgently needed. Launching it without the necessary improvements would further erode the competitiveness of the European steel industry. This is indispensable given that the EU carbon price has reached approximately 80€/t, while over 25 million tonnes of steel – equivalent to around 20% of EU production – are imported annually from third countries without any carbon cost.

European Steel Association (Eurofer)

Distribution coil at Wednesfield Steelpark (Photo: Tata Steel UK)

Hydrogen to replace natural gas

EU project to promote hydrogen as a fuel for reheating processes in the steel sector

TwingHy, a project co-funded by the EU, mainly aims to introduce hydrogen as a fuel to replace natural gas in reheating furnaces in the steel sector. The project will develop a digital twin to control furnace behaviours and optimize operations. The technology can be useful in more of SSAB's different processes.

The Nippon Gases offices in Madrid hosted the 4th General Assembly of the TwingHy project in October 2024 (Picture: SSAB)

The objective of the TwingHy project is to explore the use of hydrogen as a viable alternative to traditional natural gas combustion in reheating furnaces in the steel sector. By developing a digital twin, a virtual copy of the physical system, the project aims to simulate and optimize the hydrogen combustion process. By combining simulation and experimentation, the project aims to provide a deeper understanding of how the technology performs, safety aspects and environmental impact, to facilitate informed decision-making and promote the transition to sustainable energy practices.

The project also looks at oxygen, so-called oxyfuel combustion. The use of pure oxygen as a substitute for combustion air significantly reduces energy demand and increases reheating furnace efficiency. Oxygen is also the other product obtained when producing hydrogen in the electrolysis of water, currently the most likely method for hydrogen production for Sweden.

Model based on energy balance using data from a slab furnace

SSAB is participating in TwingHy through Carl Ellström, who currently works in process development on the rolling side in Oxelösund, Sweden. Jonas Engdahl from Borlänge joins him in the project. Asked what has happened in the project so far, they answered: "We are looking at hydrogen heating of slabs before rolling. In practical terms, a plant in Spain is being expanded for hydrogen and tests will be carried out there with different combinations of hydrogen and natural gas. Due to the current poor availability of hydrogen, a flexible approach is needed. That's how we work too, we have a slab furnace that can run on coke oven gas, natural gas and LPG. The advantage of hydrogen is lower CO_2 emissions. At the same time, extensive simulation of combustion is carried out by another group in order for the gases to burn at an even temperature with optimal combustion."

SWERIM is SSAB's partner in this research project. SWERIM is building a model based on energy balance based on data from slab furnace 2 in Oxelösund. Carl Ellström: "We are working with SWERIM to model the heating process for better precision and lower energy consumption."

SSAB looks forward to increased use of green hydrogen in the industry. By participating in this project, SSAB is optimistic that it will gain both direct experience and a better technical understanding of how to convert to hydrogen heating and the economic viability of such an investment.

Key facts of the TwingHy project

The project started in 2023 and will continue for three years. The project has a total budget of over EUR 8 million and has nine participating companies or organizations. Half of the total budget is funded by the EU and the rest by the participating companies and organizations.

Members of the consortium are CELSA Spain, Fives Spain, Nippon Gases Spain, RWTH Aachen University Germany, University of Oulu Finland, SSAB Sweden, SWERIM Sweden, BSC Spain, Calderys Spain.

SSAB

MATERIAL FLOW LOGISTICS

Salzgitter to further decarbonize rail freight transport with hybrid locomotives

The hybrid multi-system locomotives for electric and diesel operation now serve both electrified and non-electrified routes, with increased loading capacity in both cases. The German steel company is thus reducing its CO_2 footprint and emissions, setting a milestone in the sustainable and highly efficient rail freight transport and the decarbonization of the Salzgitter Group's logistics chains.

The hybrid locomotives will be used mainly for heavy haulage from the Hamburg seaport and from the eastern Harz mountains to Salzgitter (Foto: Sebastian Bollmann)

Verkehrsbetriebe Peine-Salzgitter GmbH (VPS), central logistics service provider of German steel company Salzgitter AG, has expanded its rail fleet, adding two hybrid locomotives. In this way, VPS is increasing the sustainability and efficiency of its rail freight transport and driving the transformation of the Salzgitter Group's logistics chains forward. In future the locomotives will be transporting raw materials for the integrated steelworks of Salzgitter Flachstahl GmbH.

The EuroDual hybrid locomotives were handed over to VPS by the full-service leasing provider European Loc Pool on December 4, 2024. The vehicles feature a diesel-electric drive as well as an electric drive, meaning that they can run on electrified and non-electrified routes. This enables the use of existing overhead lines, while significantly reducing diesel consumption. Given that the locomotives can be refueled with HVO diesel, virtually CO_2-neutral diesel operation is possible. VPS harnesses green electricity for its electrical operations, which trims the company's CO_2 footprint further down.

As Dr. Johannes Dreier, Managing Director of VPS, explained: "The handover of our new EuroDual hybrid locomotives marks another milestone in our activities to decarbonize rail freight transport and the Salzgitter Group's logistics chain. In this way we are supporting the transformation of our Group's internal customers and improving the efficiency of our raw material transports thanks to the increased loading capacity." The hybrid locomotives will mainly be deployed for heavy-duty transport from the port of Hansaport in Hamburg and from the eastern Harz region to Salzgitter.

Willem Goosen, Managing Director of European Loc Pool, added: "We are proud to support Verkehrsbetriebe Peine-Salzgitter in its decarbonization strategy. Our EuroDual locomotives impress with their efficiency and flexibility and make an important contribution to the vision of green steel and to sustainable and efficient rail transport. We look forward to a trusting and successful partnership."

Salzgitter AG

> The handover of our new EuroDual hybrid locomotives marks another milestone in our activities to decarbonize rail freight transport and the Salzgitter Group's logistics chain.
>
> *Dr. Johannes Dreier, Managing Director of Peine-Salzgitter transport services VPS*

LOW-CARBON EMISSION IRONMAKING

Site selected for ESF pilot plant in Australia

Australia's two largest iron ore miners and its biggest steelmaker have selected the Kwinana Industrial Area, south of Perth (Western Australia), as the location to develop Australia's largest ironmaking electric smelting furnace (ESF) pilot plant.

> The NeoSmelt pilot plant builds on the suite of projects Rio Tinto has underway with our customers and suppliers to find better ways to accelerate their efforts to meet their decarbonisation targets.
>
> *Simon Trott, Iron Ore Chief Executive, Rio Tinto*

The groundbreaking project combines the expertise of BlueScope, BHP and Rio Tinto to test technology to enable the use of Pilbara iron ore to produce iron without the need for traditional blast furnaces, as the companies come together to try to accelerate the decarbonisation of steelmaking.

The industry leaders formed the NeoSmelt collaboration in February 2024, combining BHP and Rio Tinto's deep knowledge of Pilbara iron ore, with BlueScope's unique operating experience in ESF technology. The NeoSmelt parties also announce Woodside Energy will join the consortium as an equal equity participant and energy supplier, subject to finalising commercial arrangements. (Energy supply may include hydrogen, natural gas and electricity.) The NeoSmelt project remains open for collaboration with other parties that complement its objectives.

The pilot plant aims to prove Pilbara iron ore can be used to produce lower-CO_2 emissions molten iron using direct reduced iron (DRI) – electric smelting (ESF) technology. The pilot plant would produce 30,000 to 40,000 tonnes of molten iron a year. It will initially use natural gas to reduce iron ore to DRI, but once operational, the project aims to use lower-CO_2 emissions hydrogen to reduce iron ore.

If successful, NeoSmelt has the potential to open a pathway to near-zero emissions steelmaking using Pilbara iron ore and ensure the longevity of Australia's iron ore industry. (Although there is no standardised universal definition of near-zero emissions, the IEA has defined it as 0.40 tonnes of CO_2-e per tonne of crude steel for 100 per cent ore-based production.)

The NeoSmelt parties assessed a number of pilot plant locations in Australia before selecting the Kwinana Industrial Area in December 2024, utilising its access to transport logistics and existing infrastructure, coupled with support from a A$75 million contribution from the Western Australian Government.

Subject to funding, the project anticipates a decision to enter feasibility studies in Q2 2025 and is targeting final investment decision (FID) for the pilot plant in 2026, with operations expected to begin in 2028.

BlueScope Steel

Pilot Electric Smelting Facility

The NeoSmelt pilot plant is intended to test and optimise production of hot metal from the electric smelting furnace (ESF), a type of furnace being developed by leading steel producers and technology companies targeting low CO_2 emission-intensity steel. The ESF is capable of producing hot metal suitable for the basic oxygen steelmaking process. Iron ore is first converted to direct reduced iron (DRI) before being charged into the ESF. Together, the DRI-ESF equipment can replace the traditional blast furnace. Estimates show reductions of up to 80 per cent in CO_2 emission intensity are potentially achievable processing Pilbara iron ore through a DRI-ESF pathway, compared with the current industry average for the conventional blast furnace steel route.
Other lower CO_2 emission-intensity production routes, such as electric arc furnaces, require scrap steel and DRI produced from high grade iron ore. The ESF allows for greater flexibility in input raw materials, addressing one of the key barriers to wider adoption of lower-carbon emissions technology. The ESF also has the potential to be integrated into a steel plant's existing downstream production units.

AUSTRALIA

Greensteel Australia to build 100% hydrogen-powered rolling mill

Greensteel Australia has partnered with Danieli to build a 600,000 t/year rolling mill that will be powered entirely by green hydrogen. The facility to be located in New South Wales is targeted for commencement by late 2026.

The mill will feature a reheating furnace powered by 100% green hydrogen, cutting out NO_x emissions and effectively eliminating reliance on fossil fuel use. This advanced facility is designed to produce rebar in diameters from 10 to 50 mm and spooled coils from 8 to 32 mm primarily for the Australian construction market. It will integrate Danieli's sixth-generation horizontal billet welding technology, allowing endless rolling and continuous material flow to 14 housingless rolling stands. Equipped with a quick-change system, this design maximizes production efficiency and minimizes downtime during size changes. The mill's six-pass fast finishing block will further enhance performance, rolling smaller sizes at speeds of up to 40 m/s and feeding both the bar and spooler lines.

In addition to cutting-edge production technology, the mill will be equipped with mechanical and electrical automation, overhead cranes, water treatment systems, compressed air and a fully equipped rollshop.

Danieli

ASIA – SOUTH KOREA

Posco orders electromagnetic stirring technology

Posco has placed an order with Danieli Rotelec for a multi-mode electromagnetic stirrer to be installed on the No. 1 slab caster of steel plant No. 2 at the Gwangyang works.

The new electromagnetic stirrer to be installed by Danieli Rotelec replaces mould technology from another supplier. The two-strand caster produces 800 to 1,600-mm-wide and 250-mm-thick slabs, in ultra-low, low, medium and high carbon grades. In the same steel plant, slab casting machine No. 3 already operates with a Danieli Rotelec multi-mode electro magnetic stirrer.

Danieli

ASIA – SAUDI ARABIA

Vale signs land reservation agreement for mega hub

Vale has signed a land reservation agreement with the Royal Commission of Jubail and Yanbu for the establishment of a mega hub at Ras Al-Khair Industrial City. Set to be developed in two phases, the project has the potential to produce up to 12 million t of cold-briquetted iron ore annually.

Vale signed a land reservation agreement with the Royal Commission of Jubail and Yanbu (Photo: Vale)

Rogério Nogueira, executive vice president of commercial and new business at Vale, said, "This agreement is more than a milestone for Vale; it represents our first step towards reshaping the future of the steel industry in the Middle East. The Khair Mega Hub will serve as a model for integrating advanced technologies with sustainable practices, driving not only environmental impact but also economic value." The mega hub at Ras Al-Khair is part of Vale's broader strategy to develop integrated steelmaking ecosystems in key markets. Alongside mega hubs planned for Oman and the UAE, this facility will act as a regional enabler of green steel, supplying high-grade iron ore and fostering collaboration between Vale, steel producers, and other industrial players.

Vale

ASIA – CHINA

Shougang Jingtang produces 0.7 mm hot-rolled strip on endless mill

Shougang Jingtang United carried out successful trial production of 0.7 mm ultra-thin hot-rolled strip on its QSP-DUE (Danieli Universal Endless) plant located in the Caofedian industrial area in Tangshan city, Hebei province.

Coils of 0.7-mm-thick strip produced at Shougang Jingtang (Photo: Danieli)

The plant, featuring Danieli Universal Endless -DUE technology, can operate in three modes: coil-to-coil, semi-endless and endless production. It can roll a wide range of steel grades including weathering steel, peritectic, alloy steels, TRIP, and dual phase, with widths ranging from 900 to 1,600 mm and thicknesses from 0.8 to 12.7 mm. The recent trial production of 0.7 mm ultra-thin strip thus surpassed design expectations. The Danieli-patented DySen caster of achieved a casting speed of 6.0 m/min and a sequence length of 29 heats over an uninterrupted casting period of 16.7 hours. The plant's monthly productivity is in the proximity of 200,000 t. By maximizing the production of light and ultralight gauges – 60% below 1.5 mm – the Danieli Universal Endless plant provides Shougang Jingtang with a competitive advantage in the challenging Chinese market.

Danieli

Baosteel to modernize pickling line and tandem cold mill

Primetals Technologies has received an order for an extensive modernization of Baosteel's pickling line and tandem cold mill in Baoshan. The project is scheduled to be completed in the first quarter of 2026.

Originally built in 1998 to produce tinplate, the pickling line and tandem cold mill is being upgraded to ensure Baosteel's operations remain efficient and competitive. Primetals Technologies' scope includes the supply and implementation of comprehensive electrics and automation systems, including Level 1 automation, measuring equipment, digital assistant systems, and motors and drives. A key component of the project is the installation of a central operation cockpit, which will provide a bird's-eye view of the entire production line.

At Baosteel's Baoshan plant, the system will be supported by 63 live cameras and integrate several digital assistant systems, such as automated coil identification, strip position identification, and side trimming scrap detection

In addition to the new automation system, the project includes new measurement equipment systems and customer-supplied mechanical equipment for the entry section, a welding machine, a scale breaker, pickling tanks, a side trimmer, and new work-roll drive trains for stand No. 4 and 5.

Primetals Technologies

Baosteel's pickling line and tandem cold mill will undergo a major upgrade and modernization (Photo: Primetals Technologies

ASIA – CHINA

Shougang orders electric arc furnace

Shougang has ordered a 160-t Zero Bucket® electric are furnace from Danieli, which will be used to produce exposed automotive grades.

The new electric arc furnace, featuring horizontal preheating and continuous charging technology, will minimize carbon dioxide emissions and energy consumption. It will be equipped with technology packages enabling unmanned operation or operation with minimum personnel around to improve the performance, enhance safety and achieve intelligent steelmaking.

The new EAF will be installed at the Qian'an steelworks, in the Hebei Province. Construction will start in October 2025 with completion scheduled for December 2026.

Danieli

Fujian Kebao to build continuous annealing lines for tinplate

Fujian Kebao Metal Products, a subsidiary of the Fujian Sanbao Group, has awarded SMS contracts for the supply of two continuous annealing lines for tinplate. The two lines will be installed at the Sanbao Industrial Park in Zhangzhou City.

The lines will handle tinplate strip in thicknesses ranging from 0.12 mm to 0.55 mm and widths from 700 to 1,300 mm at process speeds of up to 750 m/min. They will have a total annual capacity of approximately 800,000 t.

The scope of supply includes furnace technology from SMS company Drever. The integration of the advanced annealing furnace will ensure efficient and reliable thermal processing. A double cold reduction mill and a twin-stand skin pass mill will be installed inline to enhance strip quality parameters, which are crucial for the production of high-end tinplate. The orders mark a significant step in Sanbao Group's effort to expand into the high-end, food-grade tinplate market, addressing the growing domestic and global demand. The lines are scheduled to go into operation in mid-2026.

Contract signing ceremony at Sanbao Group, marking the start of a new project for tinplate production (Photo: SMS group)

SMS group

Baowu places orders for automatic roll shop equipment

Pomini Tenova has signed two contracts with China Baowu Steel Group for the supply of fully automatic roll shop equipment.

The first contract includes a set of four automatic CNC roll grinders with two automatic inspection stations, served by the automatic roll loading system that comprises two loaders. The second contract is for two automatic CNC roll grinders and an automatic inspection station, equipped with an automatic roll loading system. All six roll grinders will be used in roll shops serving new cold rolling mills for silicon steel production.

Tenova

ASIA – INDIA

Tata Steel upgrades BOF converter

Danieli India has successfully completed a major BOF upgrading project at Tata Steel's Jamshedpur plant.

The project, considered highly challenging due to its complexity, the confined location of the BOF upper stacks and the safety concerns of the task, was successfully accomplished thanks to the Danieli design, the expertise of the Danieli Service team and Tata Steel's maintenance proficiency. The new upper stacks, manufactured by Danieli India at the Sri City workshops, boast an extended service life and maintenance-friendly, upgraded design.

In 2024, Danieli Service received the "Most Innovative Partner Award" of Tata Steel's InnoVista Awards for the uniqueness and innovation of this project.

Presentation of the "Most Innovative Partner Award" (Photo: Danieli)

Danieli

JSW Steel Dolvi to expand steelmaking facility

As part of its strategic expansion plans, JSW Steel Dolvi has commissioned SMS to supply a 350-t BOF converter, including a twin ladle furnace, gas cleaning plant, and corresponding level 1 and level 2 automation.

The new BOF converter will feature an advanced oxygen lance system capable of a maximum blowing capacity of 1,250 m³/min, significantly enhancing the production efficiency of the plant. The facility will also be equipped with a cutting-edge automation system, which provides users with a complete view of the plant without the need to switch between various automation levels. Additionally, SMS will supply various process optimization models that integrate process control, production strategies, and metallurgical models, thus providing consistent quality and production reliability. The new steel mill, which will increase the capacity of the existing steel mill by 3.7 million t/year, will go into operation in 2026.

SMS group

ASIA – INDONESIA

Gunung Raja Paksi chooses partner for smart factory project

Gunung Raja Paksi (GRP) has selected Rimini Street, a provider of end-to-end enterprise software support and innovation solutions, to accelerate its digital projects.

Rimini Street is a third-party support provider for Oracle, SAP and VMware software. "With Rimini Street fully supporting our SAP systems, my team can focus 100% on realizing our Industry 4.0 vision," says Ivan Widjaksono, head of digital transformation at GRP.

For GRP, SAP is the backbone system that collects and governs its floor data. A highly customized system, it pushes the collected data to an AI system that provides analytical reporting, helping to visualize the SAP data with predictive analysis and speed up the decision-making processes.

Rimini Street

ASIA – JAPAN

Nippon Steel starts up new roughing mill

At its Kamaishi special steel plant, Nippon Steel has recently started up the new roughing mill supplied by Danieli.

The main equipment supplied by Danieli included two mono-groove vertical and horizontal housingless stands. Both stands are individually shiftable by an electric actuator to alternately feed each line of the three-strand wirerod mill. The tailor-made roughing mill features shiftable stands and is designed for twist-free rolling of 130 to 168-mm billets at a rate of 130 t/h. The installation of the shiftable roughing mill has significantly increased billet charging flexibility and efficiency. Before the upgrading, the mill was only able to roll 122-mm-square billets. Roll cartridges are automatically extracted to the nearby roll shop featuring a compact Danieli roll-changing robot and an electric roll tilter.

The new roughing mill installed in Nippon Steel's wirerod line (Photo: Danieli)

The Kamaishi wirerod mill produces high-quality, special steel wirerod in mild and hard steel wire, low-alloy steel, spring steel, special melt wire, and bearing steel grades.

Danieli

THE AMERICAS – USA

Nucor's emissions targets certified by Global Steel Climate Council

Nucor Corporation has announced that the Global Steel Climate Council (GSCC) certified the Company's Science-Based Emissions Targets (SBET). The SBET submitted by Nucor sets an ambitious goal of reducing emissions by 2030 for its hot rolled steel production, which includes Scopes 1, 2, and 3 emissions.

Science-based emissions targets provide a pathway for companies to reduce GHG emissions, in line with the latest climate science necessary to meet the goals of the Paris Agreement, limiting global warming to 1.5°C above preindustrial levels, and helping to prevent the worst impacts of climate change. In the submission for the certification, Nucor, a founding member company of the GSCC, used a 2023 base year to set an interim SBET of CO_2 per metric ton of hot-rolled steel produced by 2030.

Nucor will achieve its goals by increasing the use of clean electricity, carbon capture and sequestration, and near-zero GHG iron making. The steelmaker will also utilize technologies to reduce its consumption of injection and charge carbon and will reduce the use of natural gas in its production processes. The GSCC Steel Climate Standard, adopted in August 2023 as a global standard to measure and report steel carbon emissions, also provides a framework for members to seek third-party verified certification of the emissions intensity of facility-specific products.

Nucor

Pacific Steel Group secures financing for construction of EAF micro-mill

Sustainable infrastructure investment firm Generate Capital is going to support the construction of Pacific Steel Group's electric arc furnace micro-mill in California.

The new micro-mill will convert locally sourced steel scrap into high-quality, custom-length steel rebar, a critical material for construction. The project eliminates the need for the roundtrip hauling of scrap and finished steel in and out of California, providing a transportation cost advantage and carbon emissions savings. Leveraging onsite and nearby renewable energy, electrification, carbon capture and storage and a local supply chain, the new mill is expected to produce rebar with 85% fewer emissions compared to traditional methods.

Generate Capital

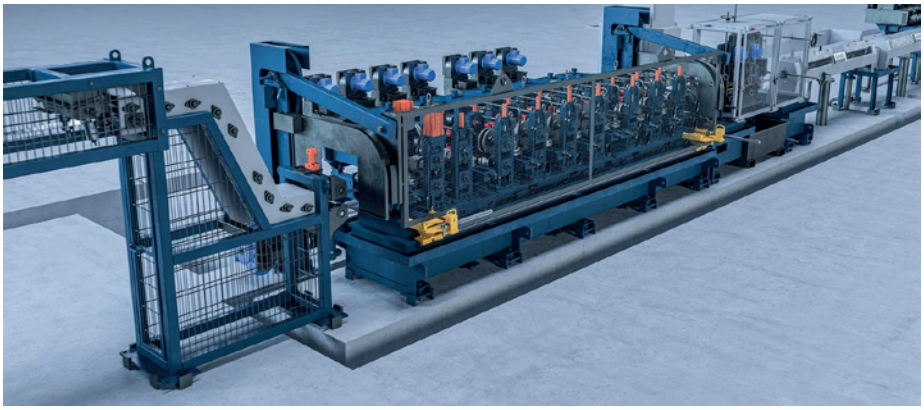
THE AMERICAS – USA

Nucor Tubular Marseilles places order for orbital cut-off saw

Nucor Tubular Products Marseilles awarded Danieli Centro Tube a contract for a new orbital cut-off saw for the existing 5K-ERW mill in Marseilles, Illinois.

The new saw will cut to length welded tubes with outside diameters of up to 168 mm (6 5/8 inch) and equivalent square and rectangular sections, and wall thicknesses of up to 9.5 mm (3/8 inch) at speeds up to 140 m/min. The high speed and excellent cut-to-length performance are obtained, among other things, thanks to a reduced weight of the moving parts.

The new orbital cut-off saw, which will replace an existing friction saw, will improve the cutting quality and avoid cutting burrs. The equipment features cutting-to-length optimization to minimize scrap tube lengths, a fully automatic setup, a reduced number of jaws and easy-maintenance design. Moreover, the new cut-off saw will be designed to fit the existing foundations without any major modifications. The new saw is scheduled to be started up by the end of summer 2025.



Arrangement of the ERW mill at Nucor Tubular Products Marseilles (Photo: Danieli)

Danieli

Order for containerized PEM electrolysers

Nel Hydrogen US, a subsidiary of Norway-based Nel ASA, has received an order for the supply of two containerized PEM electrolyser units.

The two MC500 electrolysers, 2.5 MW each, will be used to produce hydrogen for a new steel mill in the USA. The undisclosed customer already uses Nel's PEM electrolysers to generate hydrogen at two other sites in the USA. "We continue to see an increasing demand for our containerized PEM electrolysers for smaller installations as this reliable turn-key concept offers easy outdoor installation and operation," says Nel's Chief Commercial Officer, Todd Cartwright. The two new units will be produced at Nel's manufacturing facility in Wallingford, Connecticut.

Nel ASA

ArcelorMittal to build electrical steel facility in Alabama

ArcelorMittal is proceeding with plans to build an advanced, non-grain-oriented electrical steel (NOES) manufacturing facility in Calvert, Alabama. The new facility, wholly owned by ArcelorMittal, will be capable of producing up to 150,000 metric tons of NOES annually.

Plans for this USD1.2 billion investment include an annealing and pickling line, cold-rolling mill, annealing coating line, packaging and slitter line, and additional ancillary equipment needed for specialized electrical steel manufacturing operations. The facility will be located near ArcelorMittal and Nippon Steel's joint venture, the AM/NS Calvert flat steel complex with a new electric arc furnace (EAF) currently under construction and nearing completion.

Construction is set to begin in the second half of 2025, with production anticipated to commence in 2027. The project is expected to create more than 200 permanent positions to support the plant's ongoing operations.

"The new plant will greatly enhance our capacity to support manufacturers by providing a steady domestic supply of high-quality NOES, enabling them to produce superior products and avoid material shortages, extended lead times and cost volatility associated with overseas supply chains," said Peter Leblanc, CMO, ArcelorMittal North America. NOES has been identified as a critical material for producing electric motors used in all types of electric vehicles and a broad range of energy technologies and applications. The production of NOES requires specialized technical expertise, advanced manufacturing capabilities and rigorous quality control to meet stringent specifications for magnetic and mechanical performance.

ArcelorMittal

THE AMERICAS – USA

Borusan Pipe to expand operations and advance pipe production technology

Borusan Pipe is making a major investment to enhance its large-diameter steel pipe production facility in Panama City, Florida, operated by its U.S. subsidiary, Borusan Berg Pipe Holding Corp.

The Panama City facility will integrate advanced technology to shape large-diameter steel pipes through a three-step process, forming flat steel plates into "J," "C," and finally "O" shapes. These enhancements will enable the production of smaller-diameter pipes and thicker walls, achieving global standards and addressing critical market needs.

Set to commence operations in 2027, the upgraded facility will broaden Borusan Pipe's product range, producing pipes with diameters ranging from 400 mm (16 inch) to 1,524 mm (60 inch) and wall thicknesses of up to 50 mm (2 inch). This advanced technology investment marks a significant milestone for Borusan Pipe as it expands its footprint and influence in the American market.

Following a major investment in Baytown to enhance operations, the latest investment in its Panama City facilities (shown here) underscores Borusan Pipe's commitment to growth and innovation (Photo: Borusan Pipe)

Borusan Pipe

Aymium closes financing with Bedrock Industries

Aymium, producer of renewable biocarbon products, has completed a five-year, three digit million USD financing from a wholly owned subsidiary of Bedrock Industries Management Co Inc.

The new financing refinances Aymium's existing debt and adds liquidity to execute the company's near-term growth initiatives. Aymium produces a commercially demonstrated carbon-negative product for replacing coal. Aymium's renewable products are created through a non-combustion process that converts waste biomass to high purity biocarbon. The products are specifically engineered to immediately replace fossil coal without the need for any type of plant investment or process modification. The products have superior energy value, handling and environmental attributes to coal. Aymium's process uses third-party certified sustainable waste biomass and is powered by self-generated renewable energy. Aymium's current investors include Sandton Capital, Steel Dynamics, Rio Tinto, Nippon Steel Trading, and Hokuriku Electric Power Company.

The Aymium biocarbon production plant under construction in Williams, California, USA.(Photo: Business Wire)

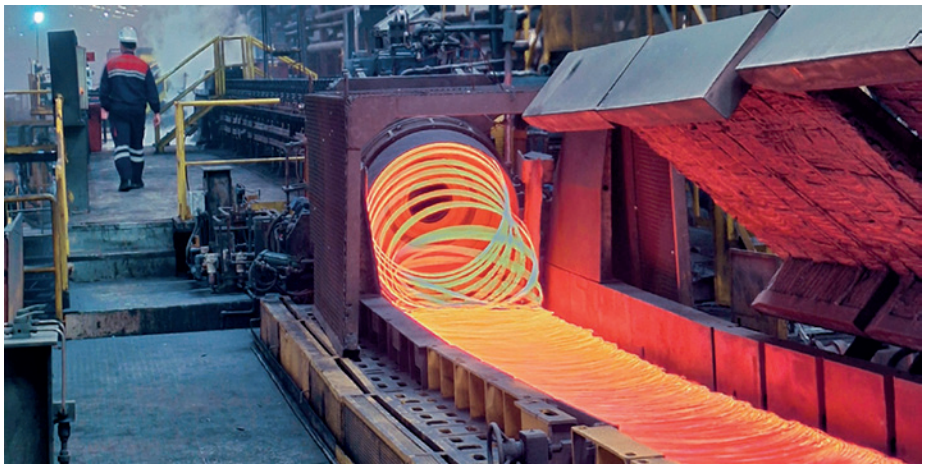
Aymium

THE AMERICAS – ARGENTINA

AcerBrag completes overhaul of finishing block

Danieli Service has successfully and according to schedule completed the on-site overhauling of a Danieli-supplied fast-finishing block at AcerBrag.

The fast-finishing block has been in operation for 20 years at AcerBrag's wirerod mill in Bragado, in the Buenos Aires province. Under the coordination of AcerBrag and Danieli Service, eight subcontractor companies were involved in the complete refurbishment of the machine, including the removal of the equipment from the rolling line, civil work and the reworking of mechanical components. The activities also comprised inspection, replacement of components, including original Danieli spares like gears and bearings, dimensional control of housings and vibrational control measurement. Self-propelled cranes and precision workshops aided with machining of parts during the revamp. The machine was ready for the restart of production according to schedule, after 21 days.



The finishing block of AcerBrag's wirerod mill was ready to resume production after 21 days of overhaul activities (Photo: Danieli)

Danieli

AFRICA – SOUTH AFRICA

Scaw Metals starts up new hot-strip mill complex

South African steel producer Scaw Metals has produced the first slabs and coils in its new hot strip complex supplied by Danieli.

The new hot-strip mill complex, built at Scaw Metals' site in Johannesburg, makes use of Danieli green steel technologies, from melting through to finishing. With the investment in this brownfield project, Scaw Metals has increased its production capacity and expanded the product portfolio to include flat products.

The slabs produced with the new vertical-curve, single-strand caster are further processed on the new hot-strip mill. The coils will feed the downstream pipe mills operated by the Barnes Group, Scaw Metals' controlling shareholder, and be supplied to other flat-product consuming companies. The complex also includes a new, state-of-the-art reheating furnace that ensures maximum energy efficiency and reduced emissions. This, together with a new, technologically advanced water-treatment plant, and a new, modern electric arc furnace for scrap and DRI melting, scheduled to come on stream in the coming months, will ensure green steel production.

Scaw Metals recently started producing slabs and hot strip at its newly built complex in Johannesburg (Photo: Danieli)

Danieli

CLIMATE-FRIENDLY IRONMAKING

Sequence Impulse Hydrogen research project to decarbonize blast furnaces

A research project dedicated to carbon reduction in ironmaking aims to develop a process that uses sequence impulse technology to inject hydrogen into the blast furnace shaft. The programme has received research funding totalling 1.8 million euros from the European Union. Additional funding contributed by the research partners will increase the total value of the project to 3.5 million euros.

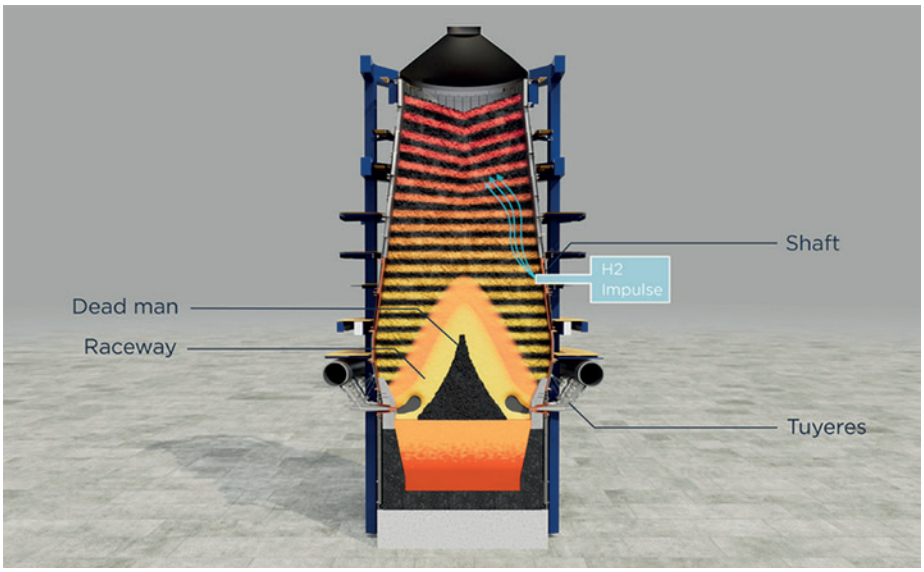


Illustration of a blast furnace with SIP technology installed and hydrogen being injected into the shaft (Picture: Primetals Technologies)

With the iron and steel sector responsible for 7-10 percent of global CO_2 emissions, commitments have already been made by the industry to achieve carbon neutrality in the next 40 years, and some producers have stated even more ambitious goals. With low-CO_2 production routes still at a relatively early stage, most of the steel being produced for years to come will be via the blast furnace route. As such, it is imperative to find technologies which can lower the CO_2 emissions of the blast furnace.

Hydrogen-based reduction is a much sought after solution to support decarbonization. The technology could lower emissions from the blast furnace by up to 20 percent. However, it is accompanied by significant implementation challenges when injected via the tuyeres.

The project builds upon the established Sequence Impulse Process (SIP) technology, developed by thyssenkrupp AT.PRO tec and already proven in large blast furnaces. The aim is to prove modelling and CFD simulations by helium injection how hydrogen could be effectively pulse-injected into the blast furnace shaft and high levels of gas utilization achieved, thereby improving steel production methods and contributing to the industry's decarbonization efforts. Potentially, up to 20% of CO_2 emissions could be reduced while utilizing existing infrastructure.

Industry leading consortium

This project, which will conclude in 2028, brings together a consortium of major European players within the iron and steelmaking sector to take the concept from laboratory to industrial demonstration.

- The key technology will be designed and provided by thyssenkrupp AT.PRO tec GmbH, a subsidiary of thyssenkrupp Materials Services.
- Furnace integration design and full-scale economic evaluation will be done by Primetals Technologies Ltd.
- VDEh-Betriebsforschungsinstitut GmbH (BFI) will serve as project coordinator, conducting analysis and modeling alongside the metallurgical competence centre K1-MET GmbH (Austria).
- Thyssenkrupp Steel Europe (Germany) will provide the industrial scale laboratory work fabrications and material burdening capabilities.
- Steel and technology group voestalpine completes the consortium as the hosts for the trial process with Helium injection to be placed on an operating blast furnace at their Linz works, Austria.

The Research Fund for Coal and Steel (RFCS) is an EU funding program which supports research projects in coal and steel sectors. Every year around €55 million is made available to universities, research centres, and private companies to fund projects. The funding is awarded to large clean steelmaking research and innovation breakthrough projects, aimed at leading to near zero-carbon steelmaking by 2030.

thyssenkrupp Steel / Primetals Technologies

Pulpit with HMI terminals of a state-of-the-art VTD plant (Picture: Danieli)

SECONDARY METALLURGY

Clean steel production: vacuum tank degassing wins on RH process

Primary steelmaking transition, shortage or limited availability of the best raw materials for the electric arc furnace process – together with maximized flexibility to produce a wide range of different high-quality steel grades, at production costs – are key for a proper choice of secondary steelmaking technology. Compared to the RH process, vacuum tank degassing offers better performances in desulfurization and nitrogen removal, and allows raw material flexibility, at lower efforts for investment and less operational expenditure.

Vacuum treatment is critical to achieving the lowest levels of carbon, sulphur, hydrogen, and nitrogen, together with the highest level of steel cleanliness. One vacuum degassing process based on liquid steel recirculation is the RH process (with / without oxygen supply). The second common degassing process is "Vacuum Tank Degassing" (VTD process). The focus of this report is on the ability of both degassing processes to treat steel melted in an electric arc furnace.

The different capabilities of RH and VTD to remove nitrogen and the impact on overall steel quality and cost control are key drivers for proper selection between the two different vacuum refining techniques.

CO_2 footprint reduction in steelmaking and adoption of the electric arc furnace (EAF) in place of the basic oxygen furnace (BOF) process, together with a shortage of clean and suitable scrap, and the limited availability of high-quality DRI and / or HBI needed for EAF melting, are the main variables to be considered when evaluating a degassing project.

Bojan Vucinic, Senior manager, Process technology, Danieli, Italy – Contact: b.vucinic@danieli.it

Flat-product quality requirements will not change due to adoption of EAF melting. An EAF-based process together with properly selected secondary refining units must fulfil the same quality requirements as BOF-based melt shops.

EAF versus BOF and impact on steel refining

Lack of sulphur removal and limited nitrogen removal during the RH vacuum process cannot be considered a disadvantage for a BOF-based melt shop as the BOF process can achieve very low nitrogen contents due to high carbon-removal rates, and very low sulphur contents based on deep sulphur removal from hot metal. The ability of the RH technique to achieve ultra-low carbon contents needed for non-stabilized, interstitial-free grades is the main reason to select such a degassing unit as part of a BOF melt shop.

An EAF's ability to produce high-quality long products is already confirmed. During the last ten years EAFs have become the melting units for flat products, including automotive grades. Continuous improvements in the EAF process, different furnace designs supported by customized chemical packages and sophisticated process controls are reasons to believe in the future of EAFs for producing low-carbon grades with ultra-low levels of non-metallic impurities.

The possibility to achieve low carbon contents at the end of steelmaking with reduced carbon versus oxygen ratio, together with low final phosphorus content, is already confirmed [1]. Is it enough just to replace the BOF with an EAF? How challenging is it to manage limited availability of raw materials and at the same time to keep melt shop flexibility as high as possible? Those are key questions during evaluation of the best available technique.

Degassing process during VTD and/or RH type of operation

Quite often the optimal degasser choice is obvious. This choice is typically based on the type of melting furnace, the production program, the metallurgical operations, design of existing equipment, and according to the metallurgical background and experience of the steelmaker. In a

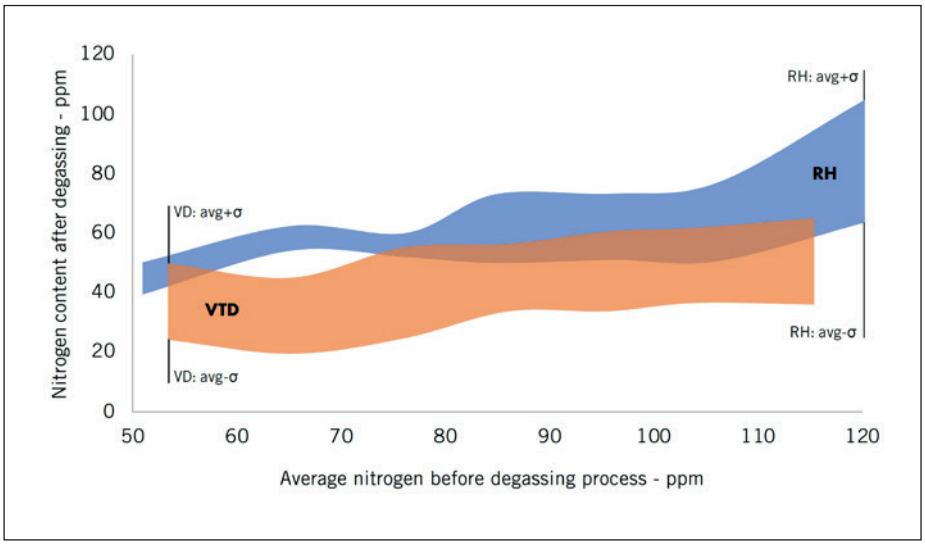


Figure 1a. Nitrogen content after degassing vs. different inlet nitrogen content – considered sulphur content for RH treated grades is lower than sulphur content for tank degassed grades (Picture: Danieli)

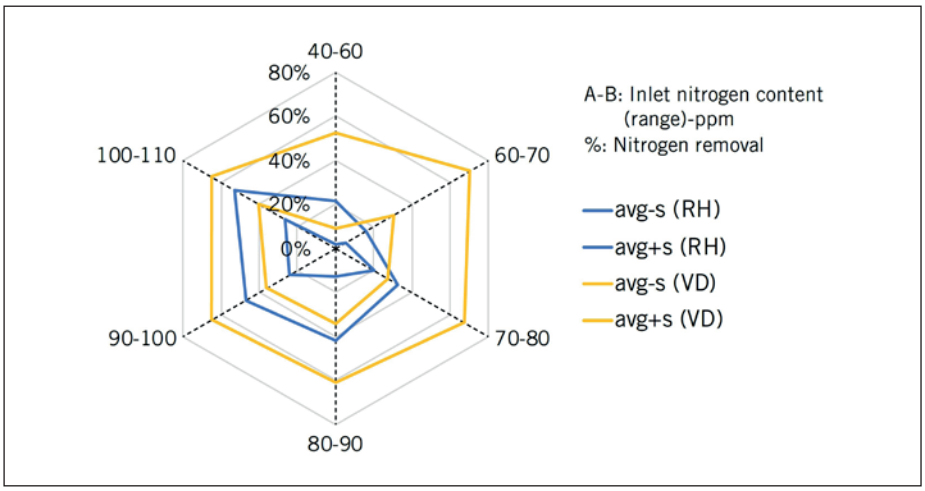


Figure 1b. Nitrogen removal for different range of inlet nitrogen content based on low-sulphur grades only (Picture: Danieli)

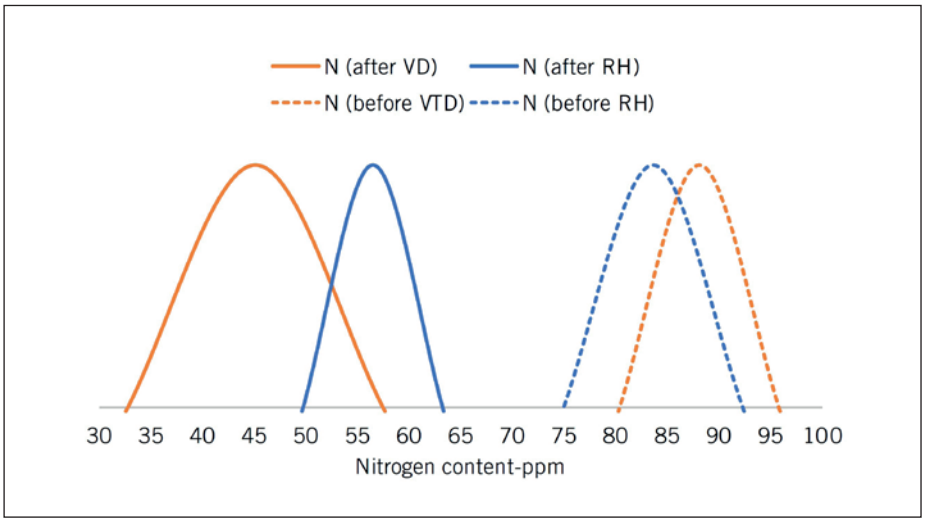


Figure 2. Nitrogen content during RH and VTD process with sulphur content in steel before degassing ≤ 40 ppm (One sigma data population) (Picture: Danieli)

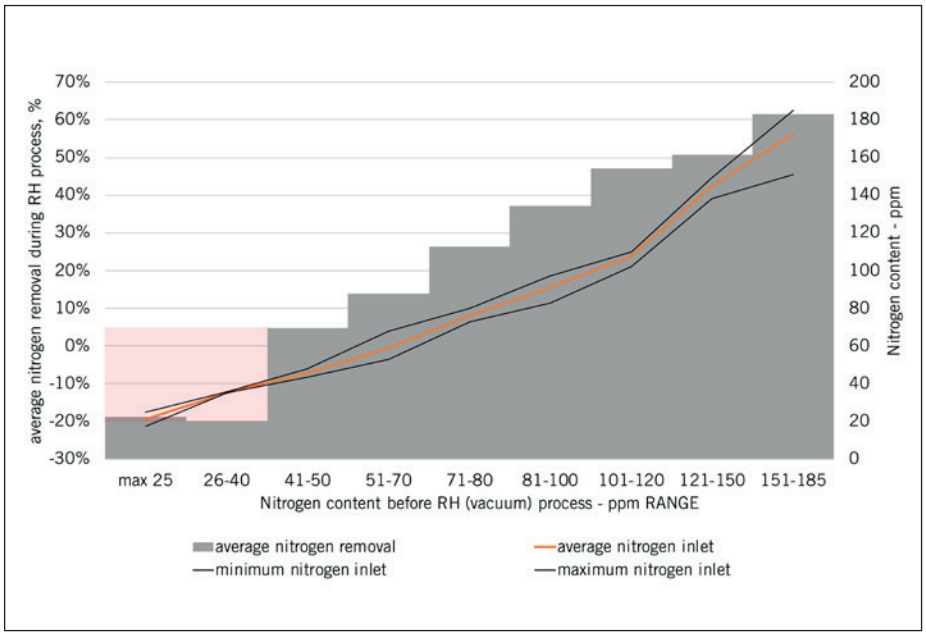


Figure 3. Average nitrogen-removal rates during RH processing with nitrogen content before and during the treatment (Picture: Danieli)

case when both types of degassers may be applied, all the individual characteristics like material flow, productivity, the share of vacuum-treated steel in the total production, the melt shop layout, or the location of the steelmaker's plant must be discussed in correlation to arrive at an optimal solution.

Different nitrogen removal patterns. Nitrogen removal during RH degassing, as part of a BOF-based melting process, has never been extensively monitored, mainly because of already low nitrogen content prior to tapping from BOF. As the steel outputs and the nitrogen and sulphur contents are different than for EAF melting, nitrogen removal during degassing became important.

To understand better the reasons for different nitrogen patterns for two different degassing units, we should understand the impact of equipment design on metallurgical performances and process behaviour as well. The RH vacuum degassing unit has much higher "free volume" above the treated steel as compared with the VTD degassing unit. The best way to reduce partial pressure of nitrogen and achieve low final-nitrogen content is to control the amounts of oxygen, nitrogen, and argon content in the off-gas.

During the VTD process, three distinct phases shall be considered:

- Phase 1: Impact of inlet nitrogen amount; higher nitrogen content before degassing will promote higher nitrogen-removal rate,
- Phase 2: Strong impact of argon bubble geometry,
- Phase 3: Low nitrogen level; to be able to have deep nitrogen removal, partial pressure of nitrogen must be reduced.

Grades for automotive applications, home appliances, tinplate grades, etc. (grades without any carbon removal under vacuum), usually have low, maximum-allowed nitrogen content and high cleanliness requirements. To be able to achieve low final nitrogen content (below 40 ppm after degassing proces), the final phase (phase 3) of nitrogen removal under vacuum is most important (**figures 1a and 1b**).

There is a clear difference between the VTD and RH processes regarding the ability to remove nitrogen, with typical nitrogen content before degassing in a range of 70-100 ppm, and with sulphur content less than 40 ppm, as shown in **figure 2** (Gauss distribution, one sigma area).

As explained above, to achieve extremely low final-nitrogen content, partial pressure of nitrogen must be reduced by increasing argon content in the off-gas. Nitrogen removal based on vacuum tank degassing is higher compared with nitrogen removal based on liquid steel recirculation under vacuum. The reasons for this difference could be:

- RH - higher "free volume" above steel level, as compared with VTD equipment design,
- higher leak rate, in a case of RH.

The impact of leak rate on lower nitrogen removal during the RH degassing process is already recognized and confirmed [2].

During production of high-quality flat products, it is difficult to expect nitrogen contents > 80-100 ppm at the end of the ladle furnace process. Most flat products could have even lower nitrogen content prior to degassing mainly due to higher application of clean and carbon-based raw material during EAF melting.

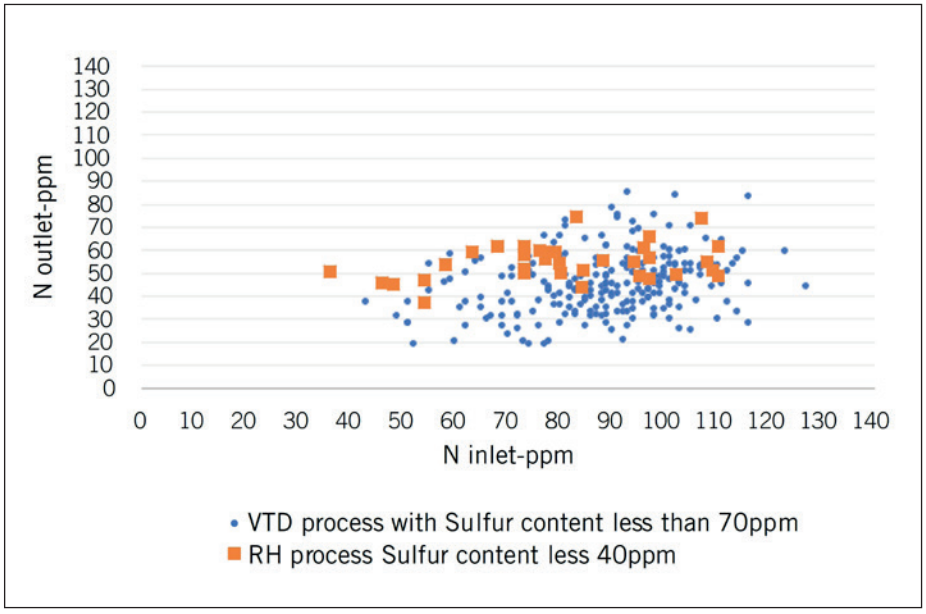


Figure 4. Nitrogen content before and after vacuum degassing (Picture: Danieli)

Figure 3 shows average nitrogen-removal rates together with nitrogen content before the process, during RH processing. With nitrogen content prior to the vacuum process in the range of 50 ppm, nitrogen removal during RH process is non-existent or negligible.

Nitrogen removal during vacuum tank degassing is better than nitrogen removal during the RH process (**figure 4**). This is especially valid for steel grades with low final nitrogen requirements or for grades where inlet nitrogen content at vacuum degassing unit is lower than 70-80 ppm.

It is possible to achieve low metallic residual contents for most flat products based on proper ratio carbon-based clean material and selected scrap during EAF process. By increasing the contribution of clean material during EAF melting, nitrogen content before tapping is lower.

With BOF melting, low sulphur contents are possible prior to tapping thanks to possibility for high levels of sulphur removal from hot metal. With the EAF as primary melting unit, low sulphur content shall be obtained during secondary metallurgy. The influence of sulphur on nitrogen removal during different vacuum degassing processes is reported below.

Another, important indication from the chart below is the need for ultra-low sulphur content prior to RH degassing. However, nitrogen removal during vacuum tank degassing is better with higher sulphur content prior to vacuum treatment.

Nitrogen removal under vacuum for VTD is easier to control than nitrogen removal during the RH process. At the same time, the VTD equipment is less complex and more "user-friendly." The removal rate for nitrogen can be described by a first order differential equation:

$$\frac{d(\%N)}{dt} = -\frac{k\rho Aef}{M}([\%N] - [\%N]eq) \quad (1)$$

where [%N] is the concentration of nitrogen in the steel, k is the mass transfer coefficient, ρ is the density of the steel, Aef is the effective reaction area, and [%N]eq is the theoretical equilibrium content of nitrogen.

The effective reaction area is influenced by the exposed surface and the concentration of active surface elements, like sulphur and free-oxygen content. Slag viscosity, slag conditions together with the argon-stirring pattern defined by the number of porous plugs, and the argon-stirring flow rate have a direct impact on the exposed steel surface.

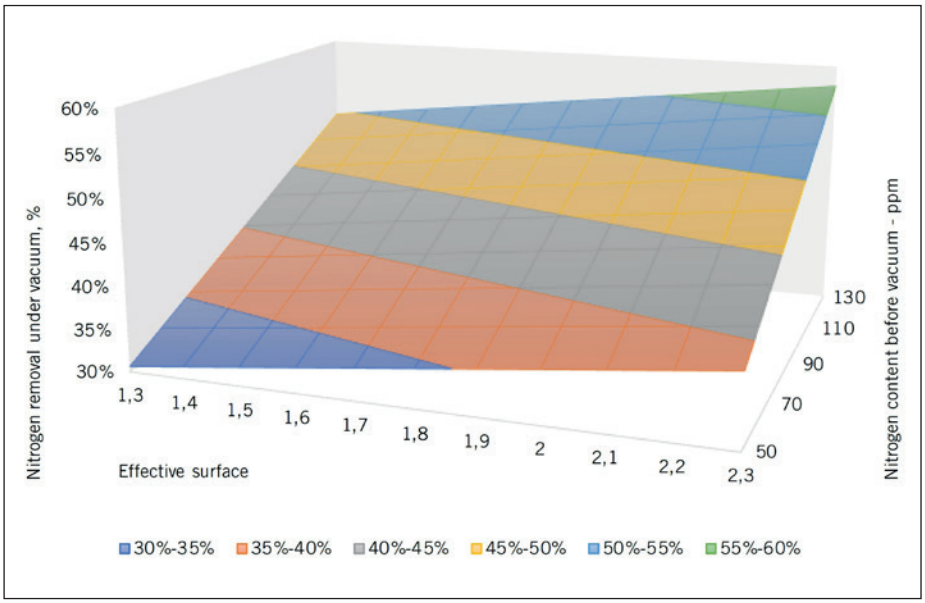


Figure 5. Impact of effective surface and inlet nitrogen content on nitrogen removal after vacuum tank degassing (257 evaluated heats) (Picture: Danieli)

The impact of the effective surface together with nitrogen content before vacuum are reported in **figure 5**. (The purpose of this chart is to demonstrate trend only.) The chart shows the nitrogen removal rate with fixed temperature, fixed vacuum time, and with different sulphur content prior to the vacuum process (as part of "effective surface coefficient) [1].

Hydrogen removal. There is no difference between the RH and VTD processes in regard to hydrogen removal. Both are highly efficient. Hydrogen removal is driven by pressure, circulation rate (for RH) or exposed surface (VTD process), and duration of deep vacuum time. However, **figure 6** shows a statistical evaluation of hydrogen content before and after degassing for both vacuum processes.

Low hydrogen content is achievable with RH and VTD as well. The chart makes clear that inlet hydrogen content is lower before the RH process compared with inlet hydrogen content for evaluated VTD grades. The main reason for lower hydrogen content in evaluated RH treated heats is that the associated steelmaking process is based on hot metal and an average 20% scrap charge (BOF pro-

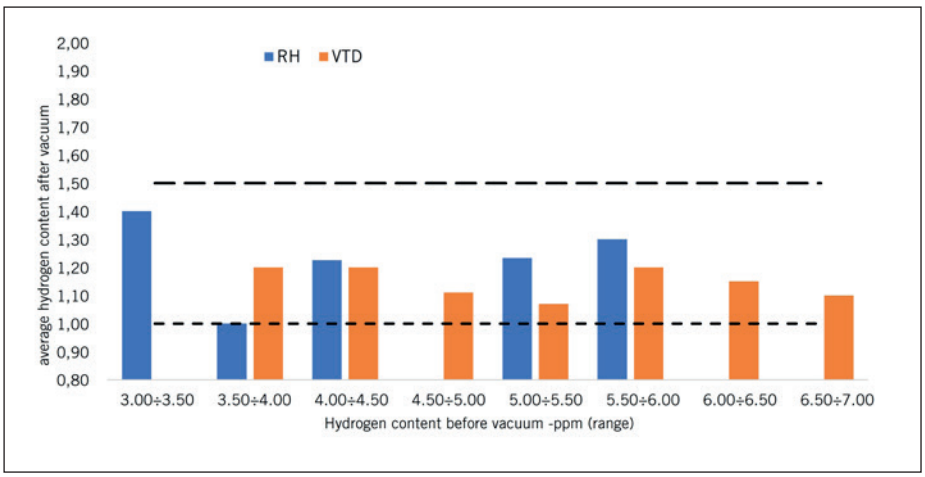


Figure 6. Hydrogen content after VTD / RH degassing for different inlet hydrogen levels (Picture: Danieli)

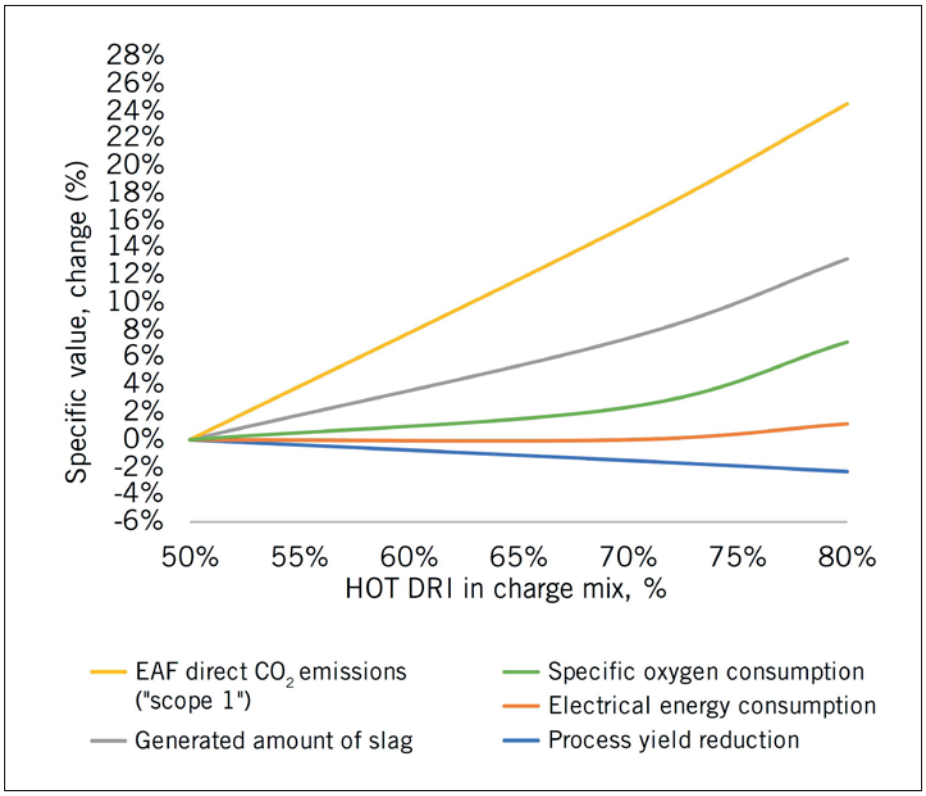


Figure 7. Impact of hot DRI in charge mix on changes of specific values; reference: charge mix based on 50% of hot DRI (Picture: Danieli)

cess). At the same time, the evaluated results from the VTD process are based on EAF melting profiles for charges of at least 70% scrap or more.

Impact of different degassing method on EAF operation

Nitrogen content before tapping from the EAF could be in the range of 25-100 ppm. Based on the ability to refine steel during the secondary metallurgy process (nitrogen, hydrogen, and sulphur pattern), and based on the type of electric arc furnace chosen, a proper charge mix must be evaluated for each grade of steel.

The best way to reduce nitrogen content in steel before tapping from the EAF is to apply carbon-based and clean raw materials [3]. For high-quality grades, the use of direct reduced iron (DRI) pellets for EAF steelmaking is limited mainly because of the impact of splashing during the process, and usually these pellets are the source of high sulphur content.

As shown in **figure 7**, the result of hot DRI in charge mix are:

- higher amount of CO_2 emitted (scope 1 – process) is caused by higher carbon content in charge mix,
- generated amount of slag is linked to higher amount (kg/tls) of charged non-metallic compounds with DRI,
- energy balance is more on the chemical than on the electrical side,
- process yield reduction is linked with the amount of gangue content in the raw materials.

The lesser ability for secondary metallurgy processes to remove nitrogen (example: RH vs. VTD) consequently makes it necessary to reduce nitrogen contents before tapping from the EAF. This is possible by increasing the amount of DRI in the EAF charge mix.

Nitrogen content reduction during EAF melting has its own pros and cons. Figure 7 shows the results of simulated EAF processes for a fixed heat size, fixed tap-to-tap time, and with the same requirements for steel quality (same tapping temperature, same slag basicity, and same carbon and phosphorous content before tapping).

Increasing carbon-based raw material in the charge mix is common practice for high-quality steel grades (e.g., grades based on free-tapping practice followed by carbon removal under vacuum), and higher production costs during the primary steelmaking process route usually are justified by higher added-value of the final product. Increasing EAF cost caused by reduced refining capability of secondary metallurgy shall be covered by a proper market forecast.

Conclusions

The choice of RH or VTD for a steel plant is determined by the steel grades to be produced. As demonstrated, overall, VTD process wins versus RH. In fact, desulfurization by VTD reduces total LF process time increasing overall meltshop productivity, also improving steel cleanliness and nitrogen removal under vacuum. Furthermore, VTD allows higher flexibility in the selection of raw materials for the EAF.

CapEx for VTD stations is much lower as compared to that for RH; production costs are also more competitive because of different process patterns and energy / steam consumption. The RH process is only recommended for ultra-low carbon, "non-stabilized" grades with production rates above 20-30%.

References

[1] B. Vucinic: High-quality low-carbon flat grades based on EAF-LF-VD process route. European Electric Steelmaking Conference (EEC) 2024

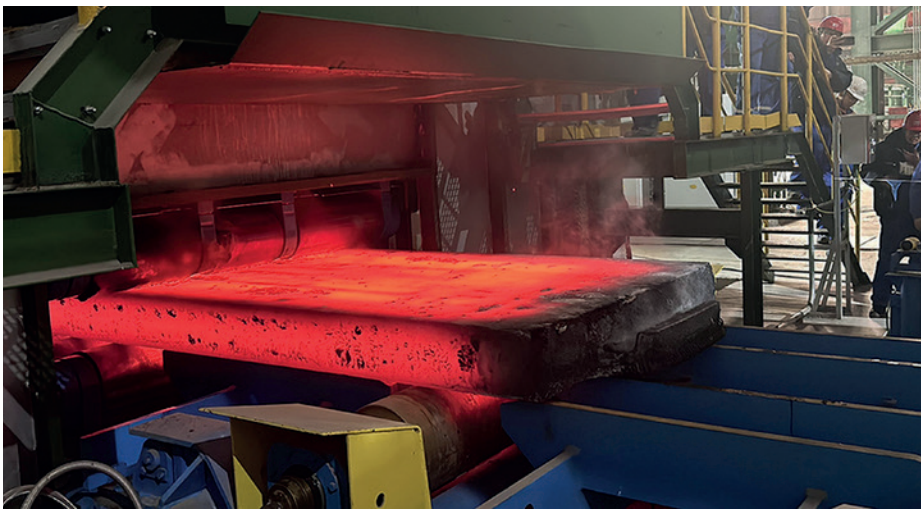
[2] Yoshiei Kato, Tadasu Kirmara, Koji Y. Amaguchi, Tetsuya Fujii and Shigeru Ohmiya: Air leak from the immersion tube in an RH vacuum degassing unit and the behaviour of nitrogen in steel. In: Iron and Steel, Vol. 83 (1997) No. 1

[3] R. Lule, F. Lopez, J. Espinoza, R. Torres and R.D. Morales: The Production of Steels Applying 100% DRI for Nitrogen Removal: The Experience of ArcelorMittal Lazaro Cardenas Flat Carbon; AISTech 2009 conference, Volume 1

GREEN STEEL TECHNOLOGIES

New slab caster utilized for green automotive-exposed steel

Chinese steel producer HBIS XuanHua has set out to produce steel with low carbon footprint for the automotive industry. The company chose a 1-strand continuous slab caster as the main mechanical scope and a comprehensive automation solution



First slab produced on HBIS Xuanhua's 1-strand slab caster (Picture: Primetals Technologies)

Chinese steel producer HBIS XuanHua Iron and Steel Group and Primetals Technologies have recently started up a slab caster with an annual capacity of 1.5 million tons at a low-carbon-emission production facility in the Xuanhua district of Zhangjiakou city, Hebei province. HBIS' plant in Xuanhua is recognised as the world's first hydrogen-based iron- and steelmaking facility on an industrial scale.

The newly commissioned 1-strand slab caster is now part of a production chain that includes a DRI plant and electric steelmaking facilities. The close to zero-carbon steel produced at this site will be used in demanding sectors such as the automotive industry.

The new one-strand slab caster is designed for versatility, capable of handling a wide variety of steel grades as well as stainless steel production. Primetals Technologies supplied the full mechanical scope along with complete Level 1 and 2 automation systems. Key mechanical features include the DynaFlex hydraulic oscillator, an advanced mould-oscillation technology improving strand-surface quality, and Smart Segments in the strand guide, allowing online and remote roll-gap adjustment for flexible control of slab-width. The caster is also equipped with DynaJet air-mist nozzles for optimized spray pattern, allowing optimal cooling of the strand, and Mold Expert, an advanced system for detecting and preventing breakouts while analyzing the casting process in the mould.

Comprehensive automation solution

State-of-the-art process models ensure precise control over key production parameters. For example, Dynacs 3D calculates the full 3D strand-temperature profile at any position along the strand, enabling optimal adjustment of secondary cooling setpoints and the point of final strand solidification. Yield Expert is a strand-length optimization system which considers factors like scrap portions, quality defects, weight limitations, and width changes to minimize the amount of scrap and optimize yield. In this way, productivity can be increased. Quality Expert tracks, supervises, and controls quality-related data and predictions for the cast products, contributing to ongoing improvement of the product quality HBIS Group is one of China´s largest iron and steel producers, specializing in high-end automobile plates, fine medium-thick plates, high-quality special steel, and products for the vanadium-titanium new materials industry.

The start of slab production was completed two weeks ahead of schedule, marking a significant project milestone.

Primetals Technologies

Key facts of the new slab plant

Operating company: HBIS XuanHua Iron and Steel Group
Plant design: 1-strand continuous slab caster
Design capacity: 1.5 million tons slab per year
Slab thickness range: 250 to 330 millimetres
Slab width range: 900 to 1,900 millimetres
Steel grades: ultra-low carbon, carbon, low alloyed, steel pipe

BENCHMARK IN CONTINUOUS SLAB CASTING AND DIRECT HOT ROLLING

145mm thick slab cast on funnel mould

Yukun Iron and Steel's new casting and direct strip rolling plant in China has achieved a significant new technology milestone

Chinese steelmaker Yukun Iron and Steel Group succeeded in producing 145-mm-thick slabs at its new Danieli QSP-DUE plant at Yuxi, Yunnan province. This is an unprecedented slab thickness for what is known as a direct casting and rolling line. Such a groundbreaking milestone was achieved by using a 152-mm funnel mould, confirming the Danieli-patented DySen caster as benchmark slab-casting technology.

Increased slab thickness means improved overall strip quality thanks to a higher reduction ratio in the mill, and new possibilities in the application of the QSP-DUE process for the production of quality hot-rolled coils. This achievement was possible thanks to the sturdiness and flexibility of the equipment and automation, and the skill of the Yukun team.

The Danieli QSP-DUE plant of Yukun is designed to produce low- and medium-carbon, HSLA and medium-carbon high-alloyed grades in ultralight gauges down to 0.8 mm in endless mode, and very thick gauges of up to 25.4 mm in coil-to-coil mode.

Discharge area of the thin slab casting machine at Yukun Iron & Steel (Photo: Danieli)

Featuring two casting strands, and endless casting-rolling on one, for a production capacity exceeding 4.5 million t per year of hot-rolled strip, the plant is the highest performing direct casting-rolling plant in the world.

Danieli

Danieli QSP DUE technology for thin-gauge HRC quality and production flexibility

In January 2022, the private Chinese company Yukun Iron & Steel Group chose this technology to produce hot-rolled coils in endless, semi-endless and coil-to-coil mode on a single line. To be installed in Yuxi city, Yunan province, China, the new quality strip plant was to become a benchmark for productivity in thin slab casting and rolling. At that time the plant was designed as follows:

- 2-strand "DySen" continuous casting machine to produce 110/120-mm-thick slabs after soft reduction,
- swivel furnace that connects casting strand #2 with the rolling mill,
- hot strip mill in 3+5 stand configuration with thermomechanical rolling capability,
- induction heaters installed between roughing stands and finishing train.

Controlled by Danieli Automation advanced process control, featuring Q3 intelligence, the plant would produce quality hot-rolled strip in thicknesses from 0.8 to 25.4 mm in any steel grade, except automotive exposed.

ROLL SHOP TECHNOLOGY

Interim results for a new roll grinding machine after two years of operation

In 2023, the Austrian ironworks Eisenwerk Sulzau-Werfen put into operation a new GEORG ultragrind roll grinder that processes rolls of up to 10,000 mm length, 1,850 mm in diameter and with gross weights of up to 60 tonnes. In addition, it is used to grind the faces and rotating surfaces of spin-casting moulds. The results after almost two years of operation show a significant increase in productivity combined with lower costs.

After the commissioning of the new GEORG grinding machine at ESW: CTO Michael Brandner (left) and CEO Georg Hemetsberger (Picture: Eisenwerk Sulzau-Werfen, R. & E. Weinberger AG)

Eisenwerk Sulzau-Werfen, R. & E. Weinberger AG (ESW), founded in 1770 in the Austrian town of Werfen-Tenneck, is one of the world's leading manufacturers of composite rolls for steel forming applications. The company specializes in the production of work rolls using the horizontal spin-casting process.

The roll grinding machine that ESW had been using for many years for the machining of rolls and casting moulds was getting close to the end of its economic life and could no longer comply with the market's growing demand for greater roll dimensions and higher manufacturing precision. Additionally, the work safety and health protection requirements for the employees had changed since the machine was first commissioned. Therefore, the management of the company decided to invest in a new roll grinding machine.

In horizontal spin-casting shops, the grinding machines are used for two different tasks. First, they are used for rough grinding the work rolls, i.e. grinding the roll barrel surface with high material removal rates. In this application, high turning accuracy is crucial. The second use is the grinding of the faces and rotating surfaces of the spin-casting moulds. The success of horizontal spin-casting largely depends on the precision of this machining process,

Michael Brandner, Raphael Vorderleitner, Eisenwerk Sulzau-Werfen R. & E. Weinberger AG, Werfen-Tenneck/Austria;
Jan Ebener, Heinrich Georg Maschinenfabrik, Kreuztal/Germany – Contact: Thomas.Kleb@georg.com

even more than in vertical spin-casting. Already the smallest eccentricity leads to unbalance forces, resulting in vibrations in the casting process. Therefore, it is extremely important that the rotating surfaces at the outside circumference are reground with the highest precision.

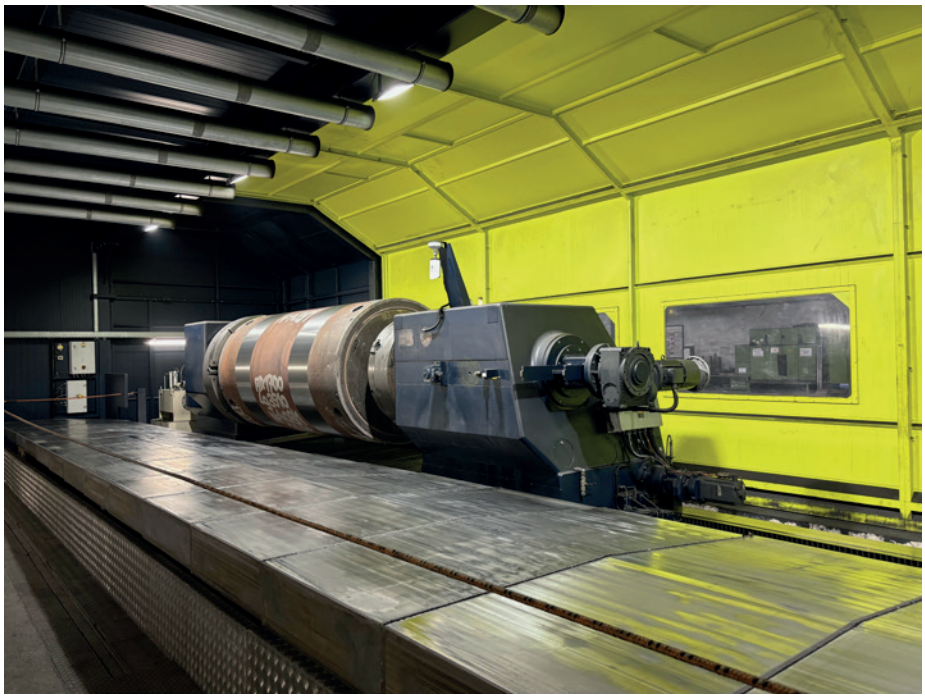
The investment project

The aim of the investment project was to buy a new machine that would be able to comply with the highest quality and productivity requirements and meet the demand of the market in the long run. For these reasons, ESW specified as requirements that the machine should be able to process workpieces with a maximum length of 10,000 mm and a maximum diameter of 1,850 mm. High process reliability and excellent long-term performance accuracy were further very important factors in ESW's decision-making. Moreover, the machine was to have future-proof control and operating systems.

ESW had been using two other machines from GEORG for many years. Due to the good long-standing relationship between the two companies, it was just natural for ESW to discuss the new project with the German machine tool manufacturer. The GEORG engineers suggested that certain design features of its range of machines – that had already proved very successful in operation at ESW – should also be used in the new machine. Moreover, the fact that the experts from GEORG were willing to contemplate and develop solutions for the specifics of the mould grinding process was a key reason for ESW to buy the machine from GEORG.

The solution

With its powerful grinding carriage, hydrostatic guides and the high-precision 2-point measuring system, the GEORG ultragrind system is perfectly suited to provide the high performance required in grinding the heavy work rolls and the large spin-casting moulds. The guideways of both linear axes and the grinding spindle are fitted with hydrostatic bearings. The wearfree guide system is characterized by outstanding longevity. Additionally, the permanent oil film between the bedslide and the machine bed, and likewise between the upper and lower carriage, dampen the vibrations caused by the



A casting mould inside the closed housing (Picture: Heinrich GEORG GmbH Maschinenfabrik)

The machine fitted with hydrostatic guides runs exceptionally smoothly, extending the life of the grinding discs (Picture: Heinrich GEORG GmbH Maschinenfabrik)

The high-precision 2-point measuring system provides ideal conditions for excellent machining performance (Picture: Heinrich GEORG GmbH Maschinenfabrik)

grinding process. Hydrostatic guides have a much better vibration dampening effect than other systems.

In addition to the machinery itself, the order scope included the electrics and controls as well as the complete housing for the entire machine complete with an exhaust system. To achieve the highest possible precision, GEORG equipped the machine with a fully automatic measuring system able to measure during the grinding process.

High user friendliness is guaranteed by an advanced machine control system that uses a modern operator guidance system on the basis of the Siemens Sinumerik One CNC system.

"Our employees' health is very important to us. Therefore, we continuously strive to further improve the working conditions for our personnel." This principle is part of EWS' mission statement. Therefore, the equipment supplied by GEORG is completely housed and fitted with an integrated high-capacity dust extraction system.

Moreover, work safety has been significantly improved by the fact that manual measuring by means of heavy mechanical gauges within the working area of the machine is no longer necessary. The operators have to enter the housed area of the machine only for adjustment activities and the clamping of the workpieces.

Bottom line after almost two years

The new grinding machine was the biggest single investment in equipment ever made by ESW. With the new machine, the company can now produce larger rolls, and has markedly increased the plant throughput – and thus the supply capability of the entire works. The heaviest roll so far processed with the new machine weighed about 42 tonnes.

The machine has met all the targets defined by the ESW project team. They had specified that the new machine should be able to achieve a grinding accuracy of one tenth of millimeter. Measurements since the commissioning of the machine have shown a precision of 15 µm – a result much better than agreed. This is largely due to the sturdy, long-term stable design of the machine, the high-precision inline measuring technology and the overall improved grinding process.

Productivity has significantly improved

Compared with the previous machine, a three-fold improvement in productivity has been achieved. The material removal rate, for example, is significantly greater than before. A further important productivity-enhancing factor is the machine's capability of operating fully automatically.

The high precision of the mould machining process has made it possible to largely reduce the number of mould grindings. Moreover, regrinding of the rotating surfaces of the moulds takes much less time now.

The new roll grinder has increased the overall production flexibility because ESW now has two rough grinding machines for large rolls with almost the same maximum center widths: 99 percent of all rolls of ESW's production range can be processed on both of these machines – a fact particularly relevant to the supply capability of the company.

Thanks to the sturdy mechanical design and the well conceived automation system, the machine achieves a very high operational availability, namely 99 percent, measured over a period of three months. A further benefit is the highly efficient support by the GEORG service team. Via the special 'connectedservice' software, the GEORG experts can log in to the new plant remotely from Kreuztal and instantly provide support and solutions.

A welcome side effect is the cost reduction achieved as a result of the reduced expenditure on grinding discs. Due to the hydrostatic design, the machine runs very smoothly, extending the life of the grinding wheels as a result.

Innovative control system

While the old machine required numerous manual activities to be performed by the operators, the new machine operates fully automatically: All that needs to be done is entering the parameters for the respective roll and the final diameter to be achieved into the system. The subsequent grinding process runs fully automatically, without any manual intervention.

The GEORG smartcontrol system – a decisive factor for ESW to decide in favour of the GEORG machine – has proved highly successful and as a step into the right direction. The HMI is intuitive and the programming very easy to learn.

Additionally, GEORG smartcontrol provides very important machine data and is essential in documenting the processes. A protocol is stored of each mould and roll machined. Thus, it is possible at any time to trace back every single processing step. If unwanted trends are being recognized, action can be immediately taken on the basis of actual measured data.

Outlook

The use of cast rolls is still the standard in rolling mills. Designed for roll weights of up to 60 t, the new grinding machine is fit for future requirements in terms of workpiece dimensions and the automation system installed.

With a view to international competition, we have to be better and more efficient in terms of technology. In other words, we have to make up for the higher costs in Europe through higher efficiency. In this respect, the new machine makes a crucial contribution. A further key factor is that our customers can continue to rely on our high level of service, trouble-shooting capability and support.

Heinrich GEORG GmbH Maschinenfabrik, Kreuztal, Germany

HOT ROLLING

Çolakoglu Metalurji to add wear-resistant steels to its product portfolio

The Turkish steelmaker is investing to enter the market for wear-resistant steels. The latest technology upgrade for the hot strip mill has achieved a stable and almost autonomous rolling process. Now the laminar cooling section and the downcoilers are to be upgraded.

Cooling groups of the existing laminar cooling system (Picture: SMS group)

Steel producer Çolakoglu Metalurji AS, Dilovası, Turkey, has placed an order with SMS group for the modernization of the laminar cooling section and the downcoiler in its 1,850-millimeter hot strip mill. SMS group delivered the 1,850-millimeter hot strip mill back in 2010. The most recent technological upgrade of this mill, also performed by SMS group, has not only ensured stable and near-autonomous rolling, but also improved product quality and reduced maintenance costs in the finishing mill [1].

With this current modernization, the Turkish steelmaker is aiming to expand its range of products to include wear-resistant grades, which are used in the manufacture of truck beds, excavator buckets and mining applications. Steel sheets and plates such as these are usually delivered in a quenched state. This will be achieved by increasing the cooling rates in the laminar cooling section of the hot strip mill. The increased cooling rate is also beneficial for other steel grades in the product mix. The use of various alloying elements can be reduced, saving significantly on operating costs.

Immediate intensive cooling

Optimized cooling of hot-rolled wear resistant steel grades takes place quickly and early, following the last rolling pass in the finishing mill. The first cooling groups in the laminar cooling section will be replaced by super-reinforced cooling technology, which provides a specific water application rate that is almost three times higher. To improve flow control and maintainability, new flowmeters and control valves will be installed throughout the laminar cooling section.

The steel company relies on the integrated solutions provided by SMS group, which feature advanced control systems and process models from the X-Pact® product family. To ensure the best results for the enhanced product mix, the existing X-Pact® Cooling Section Control system will be upgraded and adapted to the new equipment, ensuring a fully automatic cooling process.

Additionally, the X-Pact® Microstructure Property Model (MPM) will be implemented, which offers specialized functions for monitoring and simulating mechanical properties. This model benefits customers significantly by reducing the number of material samples required, thereby saving time and laboratory costs. It also enables the prediction of mechanical properties, allowing for the quicker quality release of products after rolling.

Improved coiling capabilities

In addition to the laminar cooling system, the modernization also covers the downcoiler area. Wear-resistant strip is coiled at low temperatures, i.e., below the martensitic transformation temperature of the material. To process these grades reliably and accurately, the drive train for both downcoilers will be upgraded, and reinforced chute roller tables with position/force control will be installed.

Implementation of new equipment

To minimize production disruptions during the execution of the new facilities and to reduce downtimes, the new equipment will be largely pre-assembled before delivery. The modernized hot strip mill is scheduled to go into service in autumn 2026

SMS group

Reference

[1] Integrierte Regelung der Bandführung für mehr Stabilität im Walzprozess. In: STAHL + TECHNIK; 3/2024 (June); pp. 54-55

AUTOMATION AND DRIVES

Roller table motor paired with variable speed drive for hot rolling mills

ABB's IEC low voltage roller table motors are now available at pace in response to increasing demand. The motors, designed specifically for the steel industry's rolling mills, have up to 20-year lifespan and have been shown to slash operating costs at mills around the world.

The global steel industry is facing rising costs and tighter environmental regulations, making operational efficiency key to staying competitive.

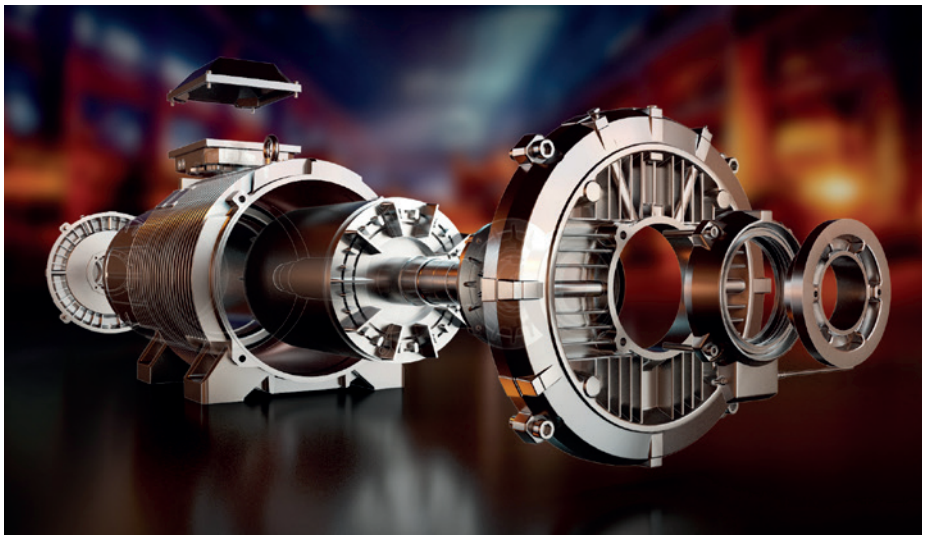
ABB has strengthened its roller table motor offering, increasing availability in response to growing demand. The motors, designed specifically for the hot and corrosive environment of steel mills, are paired with ABB variable speed drives (VSD), allowing for intense and dynamic workloads while minimizing downtime and operational costs.

ABB's roller table motors have a long lifespan thanks to the product's shock-proof, temperature-resistant shell that repels both dust and moisture, as well as ABB's world-leading quality and reliability performance testing.

Peter-Stefan Tampsi, Segment Manager at ABB IEC Low Voltage Motors, says, "The steel industry operates under intense and very demanding conditions, both in terms of the manufacturing process and the market. The robustness of the roller table motor perfectly paired with ABB VSD can play a major role in competitiveness and profitability."

ABB's roller table motors are purpose-built to meet the steel industry's need for increased efficiency and reliability. The product's dimensions, arrangements, and power ratings are fully customisable and can be installed with minimal disruption. Even at older mills which haven't had an infrastructure upgrade in decades, installation is seamless.

Peter-Stefan Tampsi continues, "A joined-up approach to motor and VSD selection is key to streamlining the wider upgrade of the global steel industry. More than ever, we're aiming to be a one-stop shop for the industry, and our roller table motors are now available at pace."



Roller table motors are purpose-built to meet the steel industry's need for increased efficiency and reliability (Picture: ABB)

> The robustness of the roller table motor perfectly paired with ABB VSD can play a major role in competitiveness and profitability.
>
> *Peter-Stefan Tampsi, Segment Manager at ABB IEC Low Voltage Motors*

ABB itself has over 30 years of experience providing roller table motors to the steel industry and operates in more than 100 countries around the world, giving the company unique insight and experience into the common and unique challenges in each region.

ABB Motion

INVESTING IN THE FUTURE FOR ELECTROMOBILITY

ThyssenKrupp Steel steps up production of electrical steel for energy-efficient motors

A new strip processing line from the SMS group with an annual capacity of 200,000 tonnes has commenced operations at ThyssenKrupp Steel's Bochum plant in Germany. It will secure Bochum as a steel location in the long term and create a total of more than 200 new and highly skilled jobs.

Start of commissioning (from left:) Engin Karakurt (Chairman of the Works Council), Dr. Harald Espenhahn (Head of Technology and Environmental Management), Andy Rohe (Head of Downstream Operations), Thomas Eiskirch (Mayor of Bochum), Dr. Marie Jaroni (Chief Transformation Officer), Markus Kovac (Head of the Bochum plant area) (Photo: thyssenkrupp Steel)

ThyssenKrupp Steel continues to implement key investments for the future: with the new annealing and isolating line having been taken into operation in January 2025, the modernization of the Bochum location is now largely complete. The modern and energy-efficient plant enables manufacture of up to 0.2 millimetres thin electrical sheet with particularly homogeneous mechanical and magnetic properties. They are specially designed to meet the requirements of highly efficient motors used primarily in electric vehicles. The rolling mill upstream of the annealing and isolating line, a double reversing stand installed on the basis of the latest technology, has already been completed. The two new units are set to be complemented by a new electrical steel inspection line and a finishing line, for which the order has now been placed, to cut the finished sheets and tailor them to customers' requirements. The finishing line is scheduled to go on stream in 2026.

Dennis Grimm, Spokesman of the Executive Board at thyssenkrupp Steel: "By taking the annealing and isolating line into operation, we are making an important step towards the future. We have invested around 300 million euros in our Bochum site in order to strengthen and expand our position in steel grades for electric mobility and high-strength multiphase steels. In conjunction with the major investments in the Duisburg location, we are now on the home stretch in implementing the investments provided for in Strategy 20-30. The core of the strategy remains realistic and sound despite the changed market conditions: namely the consistent optimization of our production network and our product portfolio to cater for future markets and the growing demands of our customers."

Aligned with future market requirements: thinner, highly silicized, NGO electrical steel with optimized properties

The new annealing and isolating line will be capable of producing over 200,000 metric tons of non-grain-oriented electrical steel per year. The Düsseldorf-based plant builder, the SMS group, is the project partner for the construction of the plant.

High-grade NGO steel (non-grain-oriented electrical steel strip) is characterized by its special magnetic properties and low core losses, which are crucial for energy-efficient motors, generators, and applications in the electromobility sector. The annealing and isolating line is designed for an annual capacity of 200,000 tons and processes electrical steel strip in widths of up to 1,350 millimetres and thicknesses of between 0.20 and 1.00 millimetres at a process speed of up to 150 meters per minute. The technology comprises a precise heat treatment in which the cold-rolled strip is first cleaned and subsequently recrystallized. After that, a layer of insulating varnish is applied to ensure optimal electrical properties.

Technological highlights. SMS group supplied the complete strip processing line from a single source: In addition to mechanical equipment, process engineering and electrical and automation systems, SMS

subsidiaries supplied furnace technology from Drever, an induction heating system for the furnace from Elotherm, and an automated coil transfer system from Amova.

The technological core of the line is the combined heat treatment and coating process. The **Drever furnace** features a patented rapid heating system that attains temperatures of up to 1,100 degrees Celsius. A combination of natural gas-fired radiant tube zones, inductors from Elotherm, and electrically heated zones is used to precisely control the annealing process and optimize the microstructure of the electrical steel strip. For example, materials with special magnetic properties and low core losses are produced in this way. The intelligent furnace control system I-Furnace® optimizes the production process using data-driven models that predict the material properties and allow specific adjustments to be made during production. This results in high material quality, an improved CO_2 balance, and lower production costs.

An essential element of electrical steel strip production is the **advanced coating technology** that is integrated in the line and used to apply a layer of insulating varnish. The technology comprises two horizontal coating systems (roll coaters), which were developed especially for electrically insulating coatings, and a flotation furnace for drying purposes. This setup ensures that the insulating varnish is applied to the strip surface in very thin, uniform layers of up to 0.5 micrometres without any flaws, and is dried in a contactless manner.

Innovations and digital integration. The furnace rolls as well as the pay-off and tension reels in the new line are equipped with X-Pact® Torque Drives, which transmit high torques directly and without having to use additional gear units. These compact and efficient direct drives minimize energy losses, reduce noise levels, and require minimal maintenance.

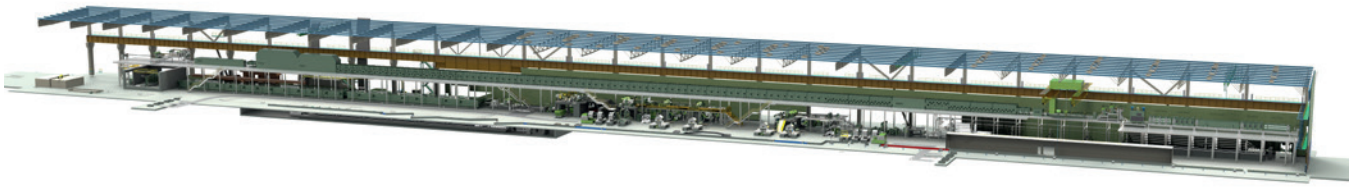
The project was successfully implemented in an existing industrial environment at the tkSE site in Bochum. The entire plant was engineered using 3D modelling. In this way, potential risks were minimized at an early stage and a seamless integration of the new plant into the existing infrastructure was ensured. SMS's X-Pact® Plug and Work concept for conducting automation integration tests using the plant's digital twin enabled final optimizations to be made before the equipment was installed. This approach allowed the facility to be put into operation within a shorter time.

The 364m long annealing and insolating line has a capacity of over 200,000 tonnes of high-tech electrical steel (Picture: thyssenkrupp Steel)

High-tech steels from Bochum for the future of electric mobility

Thanks to the modernization campaign, the production facility in Bochum is being continuously developed into a centre of excellence for electric mobility and high-strength materials. Following the implemention of the double reversing stand, the construction of the annealing and isolating line marks the completion of the main transformation step. The production of highly specialized electrical steel can now be further expanded in Bochum, as the trend in electric mobility is also moving towards ever more sophisticated grades. These high-quality, extremely thin steels with a high silicon content make a decisive contribution to improving energy efficiency, thereby increasing the range of electric vehicles, among other things. In the new plant, the structure of the cold-rolled strip is recrystallized during the annealing process. The appropriate texture can then be set, and the sheet is coated with an insulating layer after the annealing process. This is particularly important for the materials used in electric motors and generators to increase the efficiency of the motors and minimize core losses.

> Greater focus, improving our competitiveness and concentrating on the needs of our customers have set the pace for our new direction.
>
> *Dennis Grimm, Spokesman of the Executive Board at thyssenkrupp Steel*



3D model of the new annealing and isolating line for the production of non-grain-oriented (NGO) steel (Picture: SMS group)

Development of the site with scope for future adaptation

The modernization of the Bochum location is an essential component of the market-oriented optimizations of the production network implemented by thyssenkrupp Steel since 2020, as well as the plans for the realignment of the company presented last November. The focus on high-tech steels for electric mobility and high-strength multiphase steels will form the core of further development in Bochum.

Electrical steel production for electric motors and generators is currently still taking place at the plant on Castroper Strasse. However, the grades demanded by the market in the future will only be able to be produced using the new high-tech units. This is why electrical steel production will be gradually transferred to the new facilities once the finishing line on Essener Strasse has been taken into operation.

Dennis Grimm: "Greater focus, increasing our competitiveness, and concentrating on the needs of our customers have set the pace for our realignment. The Bochum location will play a central role in this. We intend to concentrate our expertise there, thus future-proofing the location and preserving as many high-quality jobs as possible in the long term. We have now created the essential prerequisites to this end."

thyssenkrupp Steel / SMS group

Exstream II quench technology for quality plates

Indian steel producer Jindal Steel & Power Ltd. continues modernization of the Steckel mill in Raigarh, India.

The new, Danieli Direct Quench DQ system Exstream II ordered by Jindal Steel & Power Ltd. will significantly enhance the cooling system capabilities, extending the range of achievable cooling rates and different cooling strategies in plates production.

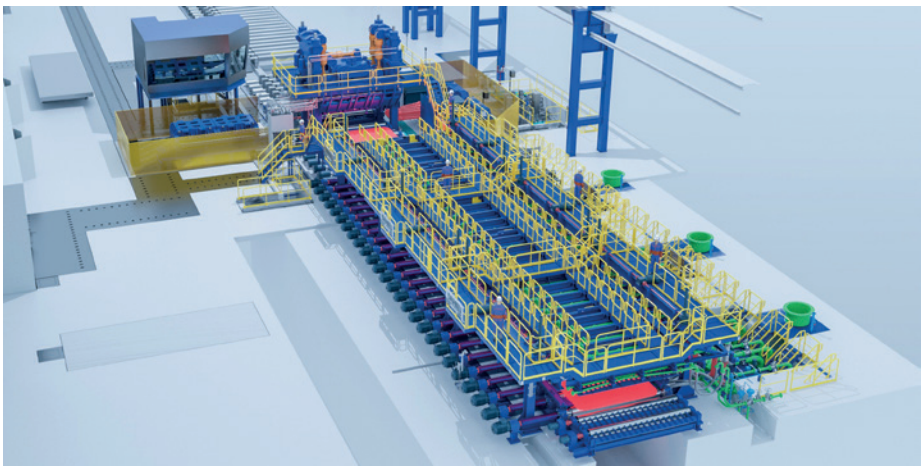
Exstream II is the new-generation cooling system that allows easy and flexible production of a wide range of added-value products like high-strength steels, of plates with different mechanical properties, and lowers OpEx by reducing the amount of alloy elements in the steelmaking process for final products with improved weldability.

The direct quench section of Exsteam II system can operate in two modes: high-pressure mode with very high cooling capability, and low-pressure mode, functioning as a normal accelerated cooling module.

The nozzle pattern ensures a uniform and effective cooling process. The headers are arranged in zones with independent control by proportional valves, allowing for the creation of a thermal profile across the plate width and ensuring precise final plate temperatures.

This installation follows a major revamping project executed by Danieli several years ago, which included major upgrades to the 4-high finishing stand, pinch-roll shears, and automation system, along with new Accelerated Cooling System (ACC), power downcoiler with coil handling system, and sampling station.

All equipment will be manufactured at Danieli India quality workshops in Chennai.



Exstream II is the new-generation cooling system that allows easy and flexible production of a wide range of added-value products (Picture: Danieli)

Danieli

GREEN STEEL INVESTMENTS

Australia's new bar mill to produce sustainably in a continuous process

The new facility positions Future Forgeworks as a pioneer in the production of green reinforcing products for the construction sector in Queensland and beyond. This greenfield project incorporates CMT® technology, reducing reliance on fossil fuels. The project will make a significant contribution to decarbonisation efforts by reducing emissions by approximately 90 per cent compared to current regional figures.

Future Forgeworks, a steel manufacturer based in Brisbane, Australia, has commissioned SMS group to supply the nation's first Continuous Mill Technology (CMT® 350) mill. Future Forgeworks' landmark project, the Swanbank Green Steel Mill, will produce rebar steel in a continuous process, thus guaranteeing low carbon emissions and highly efficient production.

Following statutory project approvals, work is scheduled to start in early 2025. The project is expected to produce its first bar within 24 months from the commencement date, with full completion anticipated by the end of 2027.

Future Forgeworks' new mill aims to set new benchmarks in sustainable steel production in Australia, reflecting a commitment to environmentally conscious manufacturing. It also seeks to meet the increasing demand for sustainable construction materials. The innovative **CMT® technology** facilitates an energy-efficient steelmaking process by supplying liquid steel directly to a high-speed caster, which seamlessly feeds the rebar rolling mill. This direct integration eliminates the need for a traditional fossil fuel-fired reheating furnace, significantly reducing energy consumption and carbon emissions. By minimizing reliance on fossil fuels, the technology aligns with global efforts to mitigate industrial emissions.

The CMT® 350 mill is designed such that no natural gas is required for billet reheating, thereby achieving a reduction in CO_2 emissions of up to 30 percent compared to other rebar mill processes. SMS will supply the entire plant from a single source, ensuring streamlined delivery and integration. This includes the engineering and procurement of new steelmaking facilities, featuring an **electric arc furnace** that is focused on efficiency and sustainability and equipped with technologies to minimize emissions and enhance safety. Additionally, the project comprises

- a fume treatment plant,
- a ladle furnace,
- a caster, and
- a rolling mill

with a capacity of 350,000 tons per year.

From left to right: Carlo Cascino, David Maurizio (both SMS group), Rumi Masih, Courtney Walker, Francisco Parot (all Future Forgeworks), Bernhard Steenken (SMS group), Rohan Richardson, Jason Whitaker, Serena Turner, Scott Waddell (all Future Forgeworks), Andrea Mas and Paolo Marin (both SMS group) (Picture: SMS group)

The TBK **REBARgauge**, an autonomous laser measurement system, enables early detection of dimensional anomalies, allowing adjustments to be made during production to meet specified standards and reduce material waste. This high measurement accuracy provides for full exploitation of production tolerances, ensuring every product meets stringent quality standards. SMS Elotherm inductive heating furnaces will reheat the steel billets, using green electricity. The CMT mill will be digital-ready and enables seamless integration with state-of-the-art digital systems.

SMS has partnered with Future Forgeworks on the mill design to optimize operational expenditure, providing Future Forgeworks with a competitive edge in the rebar market. The integration of mechanical, electrical and automation systems will guarantee seamless operations and enhanced productivity.

"We are very proud to be partnering with SMS group. Bringing this proven technology to Queensland significantly underpins the development of our landmark Swanbank project, in line with our goal to build Queensland's first green steel mill. Through the application of the SMS technology, Future Forgeworks' project will make a considerable contribution to decarbonization efforts by reducing emissions by approximately 90 percent when compared to the current domestic market," says Rohan Richardson, Managing Director, Future Forgeworks.

SMS group

INSPECTION TECHNOLOGY AS AN ECONOMIC LEVER

Efficiency gains in the production of hot-rolled sections lead to additional sales

In the demanding world of steel production, precision and efficiency are critical to success. Store Steel in Slovenia, a leading producer of speciality steels in specific market niches, has shown how the use of advanced technology can lead to significant cost savings and improved production capabilities. Their secret weapon? Sophisticated inspection technology from Zumbach Electronic AG, among others.

The PROFILEMASTER® SPS system designed for real-time monitoring of complex steel profiles proved to be the ideal solution for the needs of the Slovenian bar manufacturer Store Steel. This advanced measuring solution from Zumbach Electronic uses from 4 to 8 cameras to capture and measure the production line's profile contours, with the ability to work in exceptionally hot conditions, up to 1200°C. The system's high sampling rate and temperature-stabilized measuring capabilities ensure maximum accuracy and early detection of process issues.

The production of steel bars with different cross-sectional shapes is inherently delicate and costly, with quality assurance and product specification being paramount for both manufacturers and end customers. Slovenian Store Steel, recognizing these challenges, sought a solution that would not only improve their product quality, but would also optimize their production process whilst reducing manufacturing costs.

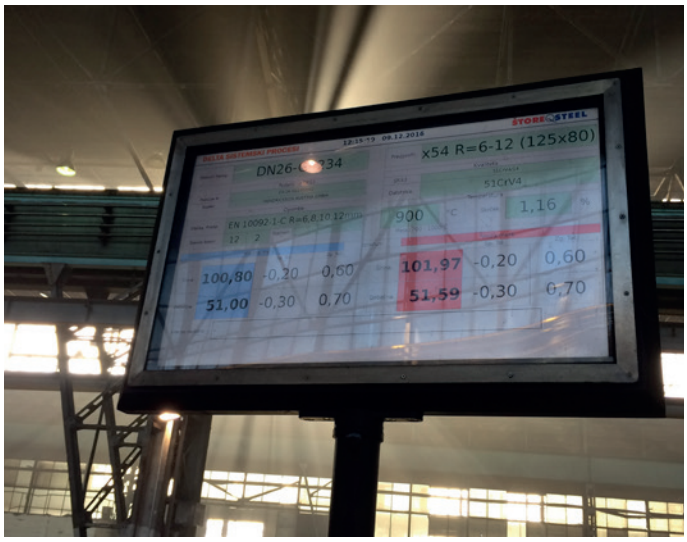
Since its implementation in March 2017, the PROFILEMASTER® SPS has revolutionized Store Steel's production lines. The system's ability to provide fast and precise measurements has significantly reduced technical downtime by just over 2%. The most substantial savings, however, have been realized during the setup of rolling stands during product changes. With the contour measurement capabilities of the new inspection system, operators can bring products into tolerance more quickly, reducing the time and wasted materials associated with setup.

The impact of these improvements has been profound. Over a period of 21 months, Store Steel achieved extra sales capacity, thanks to the increased production capacity enabled by the advanced inspection technology. The return on investment for this system was realized in just a few months, underscoring its value and efficiency. The PROFILEMASTER® SPS has enhanced products quality as well as facilitating faster process optimization. The system's comprehensive reporting capabilities have allowed for detailed analysis that has enabled continuous improvement, ensuring Store Steel remain at the forefront of the steel industry.

By investing in Zumbach's innovative measurement solutions, Store Steel have not only improved their operational efficiency, but also reinforced their commitment to delivering high-quality steel products to their customers.

Zumbach Electronic

Inspection system PROFILEMASTER® SPS at the bar mill of Store Steel, Slovenia (Picture: Zumbach Electronic)

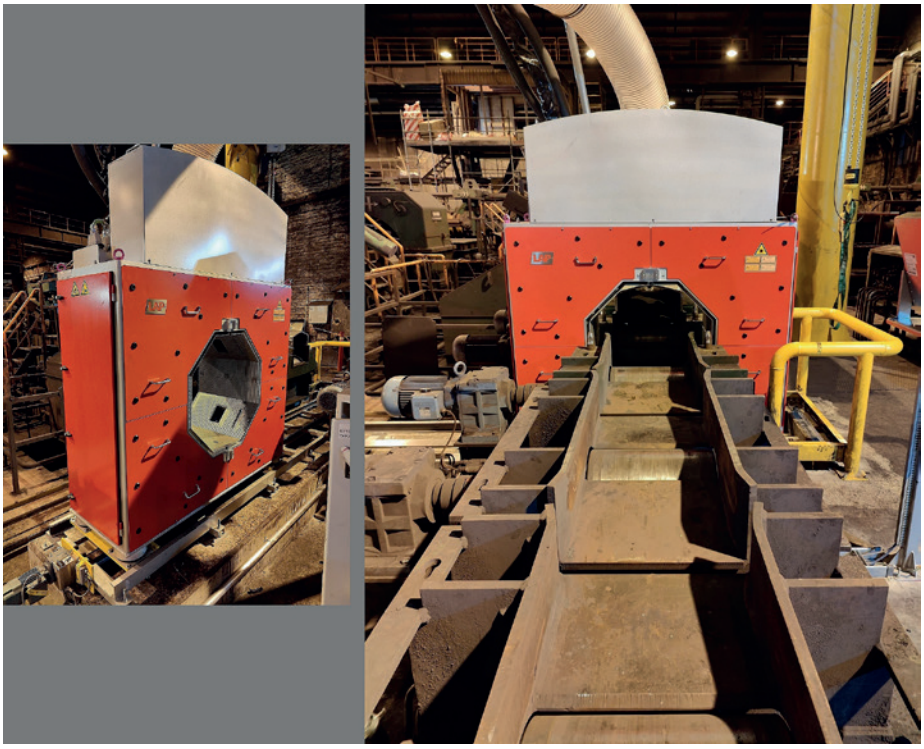


User interface of the inspection system (Picture: Zumbach Electronic)

PRODUCTION QUALITY ASSURANCE

Inline profile measurement and surface inspection

First phase of the modernization of Ovako Imatra's heavy bar mill completed



LAP inspection system installed in the profile line of the heavy bar mill (Picture: Ovako)

A new dimension measurement device has been installed at the heavy bar mill in Imatra, enhancing production efficiency, further improving steel quality, and reducing physical workload. The new measuring device is part of a € 15 million investment in modernizing the heavy bar mill at the Ovako Imatra works in Finland.

The profile measurement system was supplied by the German company LAP Laser GmbH and it is installed on the profile line of the heavy bar mill. The device is equipped with four laser modules and a high-speed camera that captures steel bars passing through the device, calculating their final dimensions with precision and in real time using advanced computation algorithms.

The need for the new measurement device arose as the share of profile dimensions in the heavy bar mill's output has increased, creating a demand for greater production efficiency.

"Production efficiency is based on increased automation. Thanks to the measurement device, the production capacity of the heavy bar mill is expected to grow by approximately 6,000 tons per year," says Otto Kankaanpää, Project Manager for the measurement device project.

The dimension measurement device also significantly improves the detection of surface defects. The analysis of surface defects relies on laser scanning and high-speed imaging.

"This technological leap greatly enhances material tracking, the already high quality, and performance monitoring at our mill. In the future, we will collect data comprising millions of measurement points from each steel bar, allowing us to pinpoint, for example, the exact point in the melt where defective surface bars originate," Kankaanpää explains.

The dimension measurement device was commissioned just before Christmas 2024. The planning and implementation of the investment involved a wide range of professionals from different fields within Ovako. The new technology also offers learning opportunities, for example, in data analytics.

"The majority of production now passes through the new measurement device. We are finalizing a few details in collaboration with the supplier, and next, we will focus on maximizing the utilization of the device and the data it produces in our processes. Operators play a key role in this, and we've received positive feedback from them," Kankaanpää acknowledges.

Ovako

> Production efficiency is based on increased automation.
>
> *Otto Kankaanpää, Project Manager at Ovako Imatra, Finland*

TUBE MAKING

Innovative solution for hot rolling of seamless hollow sections

voestalpine Tubulars in Austria has successfully commissioned the new profile rolling technology developed by German engineering company Friedrich Kocks. Following the completion of the installation and successful commissioning, the new equipment is now fully integrated into the hot rolling mill for tubes at the Kindberg site in Styria (Austria).

Before voestalpine awarded the contract to Friedrich Kocks, both had an intensive technological dialogue on the revolutionary design and construction of the new solution for rolling seamless hollow sections, after Friedrich Kocks presented this innovation during the Tube trade fair in Düsseldorf, Germany in 2024. The centerpiece of the profile rolling mill, called PWW 530/4, consists of four consecutive 530 mm, 4-roll stands. Each roll stand is equipped with two horizontal rolls and two vertical rolls facing each other and together make the roll pass (small picture). Each roll in the stands is individually driven. Based on KOCKS' proven 3-roll stand design, they feature caliber adjustment and allow for fast roll changes, providing high flexibility in production planning. The scope of supply also included the corresponding equipment for the roll shop.

voestalpine Tubulars, with its extensive experience in the production of seamless round tubes, is now also capable of producing seamless, hot-rolled square and rectangular hollow sections up to large formats and wall thicknesses.

Friedrich Kocks GmbH & Co. KG

voestalpine Tubulars installed the KOCKS PWW 530/4 rolling unit with four consecutive 4-roll stands (upper left corner) in the hot rolling mill (Pictures: Friedrich Kocks)

ELECTROMOBILITY IN STEEL LOGISTICS

Delivery of steel products by electric truck

In early January 2025, short distance deliveries of steel products by electric trucks began to customers of SSAB within a radius of up to 100 km from the Hämeenlinna plant in Finland.

From left: Lotta Ruottinen, Sales Director, Finland and Baltics, SSAB Europe and Jussi Saukkonen and Antti Häkkinen from Kuljettava Oy (Photo: SSAB)

The international steel group SSAB Europe and the Nordic road haulage company Kuljettava Oy (formerly: VR Transpoint road logistics) are working together on the electrification of heavy goods transport. Charging stations for HGVs have been installed at the SSAB plant in Hämeenlinna, and Kuljettava Oy has invested in two fully electric Scania semi-trailer combinations, the first of which started deliveries of steel products on January 9, 2025 to SSAB's customers within up to 100-km radius of the Hämeenlinna Works.

"It's great that the first e-truck transports have now left Hämeenlinna to go to Finnish customers. This supports our own goals to reduce transport emissions and to respond to customer wishes. Customers have long shown an interest in lower-emission transports, and we are now able to respond to that demand," says Lotta Ruottinen, Sales Director, Finland and Baltics at SSAB Europe.

"We're proud to have started operating and to have taken the first step in zero-emission electric heavy-duty road transport. In line with our joint strategy, we will continue to work with SSAB to reduce transport emissions. It's great to see what electricity as a means of power already allows us to do. Going forward, it will enable scaling more extensively as part of our solutions for reducing heavy-duty vehicle emissions," says CEO Tommi Välimäki at Kuljettava Oy.

SSAB aims to largely eliminate carbon dioxide emissions from its own operations in around 2030. The company's own customers, too, aim to reduce carbon dioxide emissions in their own operations.

The e-trucks are the latest technology and also reduce noise nuisance since an electric motor in itself does not make a noise. These fully electric trucks are among the largest in terms of total mass to operate in regular customer deliveries in Finland.

Joint project to electrify heavy-duty transports

The joint project between SSAB and Kuljettava Oy launched in May 2023 with preliminary studies and will last until September 2025. The main objective of the project is to investigate the feasibility of the electrification of heavy-duty industrial local transport in a commercially sustainable way to reduce emissions.

The project will collect a wide range of data, including performance data and practical experience of charging times and operating range, when e-trucks are used for short-distance deliveries of steel products.

The Finnish Transport and Communications Agency Traficom has granted support to the project, which aims to enable emission-free heavy industrial transports. The data collected will be used in Tampere University's and VTT Technical Research Centre of Finland's Six Hove project, which aims through a feasibility study to electrify heavy transport and reduce emissions.

SSAB

> Customers have long shown an interest in lower-emission transports, and we are now able to respond to that demand.
>
> *Lotta Ruottinen, Sales Director, Finland and Baltics at SSAB Europe*

REGIONAL STEEL MARKET

BE Group sees strong demand for green flat steel products in Finland

The steel service centre considers Magnelis® to be the leading metal-coated flat steel product on the market. Combined with ArcelorMittal's XCarb® offering, it is an unbeatable option for steel applications in the Nordic region.

BE Group Oy Ab is one of the leading steel service centres in Finland and is a keen purchaser of ArcelorMittal's flat products. Their close business partnership goes back several decades. They supply ArcelorMittal products to OEMs across shipbuilding, construction, cargo handling and transport, through to solar infrastructure, ventilation systems, cable trays and roof safety. In particular, it is experiencing a big demand for Magnelis® steel products, and ArcelorMittal's XCarb® offering.

Niklas Kemppinen, Product Manager Flat Carbon Steels, BE Group, explains: "Lots of our customers are talking about Magnelis®. It's perfectly tailored for the harsh environments we have to cope with here in this part of the world. It's the best metal-coated product on the market. Combining the XCarb® offering makes perfect sense and makes for an unbeatable option for our customers. Robust, workable, self-healing…and more sustainable. All in one!"

From left to right: Niklas Kemppinen, Product Manager Flat Carbon Steels, BE Group, and Marko Janno, Account Manager, ArcelorMittal Europe – Flat Products (Photo: BE Group)

BE Group sees sustainability as the only way forward

"Sustainability is the only way to ensure long-term success for a company," adds Niklas. "We're seeking to minimise the environmental impact of all our operations, and we see sustainability as a long-term driver of profitability. And as a profitable company, we can invest in the latest technology and secure our business future. It's as simple as that."

BE Group is setting a good example, building its business on three core principles of

- optimising circularity of product use,
- minimising environmental and climate impacts and
- acting for the good of its people and society.

It is now using bio-diesel for all its delivery logistics, and providing Environmental Product Declarations (EPD's) for its core products, and Magnelis® XCarb® will be added to this list shortly. "Magnelis® XCarb® could almost have been specially designed for the Finnish market," says Marko Janno, Account Manager, ArcelorMittal Europe - Flat Products.

Magnelis® is a game changer in the world of metallic coatings, offering unparalleled corrosion protection even in the most hostile of environments. Thanks to its unique composition of zinc, 3.5% aluminium and 3% magnesium, Magnelis® provides an unprecedented level of surface and cut-edge protection, with unique self-healing properties. It is available in XCarb® recycled and renewably produced steel, with a CO_2 footprint reduced by 65% courtesy of manufacture via the electric arc furnace route, using scrap steel and 100% certified renewable electricity.

ArcelorMittal

> Magnelis® is perfectly tailored for the harsh environments we have to cope with here in this part of the world.
>
> *Niklas Kemppinen, Product Manager Flat Carbon Steels, BE Group*

INTERNATIONAL STEEL MARKETS

Asia-Pacific sustainable steel market analysis and ten year forecast

The new Asia-Pacific Sustainable (recycled and "green") Steel Market Analysis and Ten Year Forecast 2024-2034, with profiles of HBIS, Nippon Steel, POSCO, Tata Steel and China Baowu Steel Group, has been published by market research firm ResearchAndMarkets.com

According to the recent analysis provided by ResearchAndMarkets.com the Asia-Pacific (APAC) sustainable (recycled and green) steel market was valued at USD175.68 billion in 2024 and is projected to grow at a compound annual growth rate (CAGR) of 10.15%, reaching USD461.80 billion by 2034.

The APAC market would be expanding due to stringent environmental regulations and rising demand for low-carbon building materials. Technological developments in steel production, such as improved recycling procedures and hydrogen-based reduction techniques, are important factors. Additionally, through strategic alliances and investments in green infrastructure projects, the APAC steel industry is growing more carbon-conscious and sustainable.

The market for sustainable (recycled and green) steel in Asia is expanding significantly due to the growing need for eco-friendly building materials and the growing pressure to comply with strict environmental regulations. The use of recycled and green steel is emerging as a crucial way to lower carbon emissions and advance the ideas of the circular economy as the region industries such as infrastructure, automotive, and construction move toward more environmentally friendly operations.

Technological developments in steel production, like hydrogen-based reduction methods and enhanced recycling strategies, are major drivers of the market growth. As nations like China, South Korea, and Japan invest in green steel production projects, hydrogen-based steel production which provides a low-carbon substitute for conventional methods is becoming more and more popular.

The demand for sustainable steel is being further accelerated by the APAC steel industry large investments in green infrastructure projects. Governments are encouraging these efforts by lowering carbon footprints through regulations, subsidies, and supportive policies.

The APAC sustainable steel market is expected to continue expanding as the need for environmentally friendly building materials rises. In order to help the region meet its sustainability goals and propel the shift to a low-carbon future, green steel production will be essential.

The scope of the report contains the following three main sections:

Product/innovation strategy. The product segment helps the reader understand the different applications of the sustainable steel products available based on application (transportation, building and construction, furniture and appliances, mechanical equipment and tools, packaging, and others), product type (recycled steel and green steel), technology type (electric arc furnace (EAF), blast furnace-basic oxygen furnace (BF-BOF), and others. The market is poised for significant expansion with ongoing technological advancements, increased investments, and growing awareness of the importance of sustainable steel. Therefore, the Asia-Pacific sustainable steel business is a high-investment and high-revenue generating model.

Growth/marketing strategy. The Asia-Pacific sustainable steel market has been growing at a rapid pace. The market offers enormous opportunities for existing and emerging market players. Some of the strategies covered in this segment are mergers and acquisitions, product launches, partnerships and collaborations, business expansions, and investments. The strategies preferred by companies to maintain and strengthen their market position primarily include product development.

Competitive strategy. The key players in the Asia-Pacific sustainable steel market analyzed and profiled in the study include manufacturers and recyclers. Additionally, a comprehensive competitive landscape such as partnerships, agreements, and collaborations are expected to aid the reader in understanding the untapped revenue pockets in the market.

Key market players and competition synopsis

The companies that are profiled in the report have been selected based on inputs gathered from primary experts and analyzing company coverage, product portfolio, and market penetration. Some of the prominent names in the sustainable steel market include HBIS Group, Nippon Steel Corporation, POSCO, Tata Steel, China Baowu Steel Group among others.

Research and Markets

Reference

[1] Asia-Pacific Sustainable (Recycled and Green) Steel Market: Focus on End-User Application, Product Type, Technology, and Country-Level Analysis – Analysis and Forecast, 2024-2034. 89 pages; ResearchAndMarkets.com - https://www.researchandmarkets.com/r/j9yb13

ELECTRA AND INTERFER TO COLLABORATE ON CLEAN IRON AND GREEN STEEL PRODUCTION

Colorado-based Electra and European Interfer Edelstahl Group have signed a memorandum of understanding to collaborate on the production of clean iron for specialty steel.

Global steel and raw materials trader Interfer is leading the call for low-carbon materials across Europe with a focus on developing sources for green steel and green raw materials. Electra's low-carbon iron production process is transforming the environmental footprint of the iron and steel industry by utilizing chemistry and renewable energy to produce 99% pure iron. With access to a reliable supply of high purity, clean iron from Electra, Interfer will support customers in reaching their decarbonization goals. Access to Electra's clean iron will also further Interfer's own sustainability goals as the company works to reduce its absolute Scope 1, 2, and 3 GHG emissions by 42% by 2030, from a base year 2022.

Electra / Interfer

SAARSTAHL RAIL CONCLUDES SUPPLY CONTRACT WITH SNCF RÉSEAU

SNCF Réseau and media representatives during a tour of the rail production facilities, on the occasion of the contract signing (Picture: Saarstahl Rail)

Saarstahl Rail, a subsidiary of Saarstahl AG based in Hayange, France, and SNCF Réseau have signed a contract for the supply of CO_2-reduced rails. The contract with a term of up to six years has a total value of over one billion euros.

Saarstahl Rail is the only rolling mill in Europe to offer CO_2-reduced rails, manufactured with the rail steel produced in the electric arc furnace of Saarstahl Ascoval – another subsidiary of Saarstahl AG based in Saint Saulve, France.

Combined with Saarstahl Rail's economic cycle concept based on recycling used rails, the optimized production process for environmentally friendly rails in the electric arc furnace cuts CO_2 emissions significantly compared to conventional production via a blast furnace route using iron ore and coal as raw materials. Based on the SNCF Réseau contract, annual carbon emissions can be reduced by 200,000 t.

Saarstahl Rail

RBB AND ARCELORMITTAL EUROPE REACH SUSTAINABLE DEAL

Polish steel service centre RBB and ArcelorMittal Europe – Flat Products have signed a memorandum of understanding that is focused on reducing CO_2 emissions in the supply chain as well as using XCarb® solutions.

This agreement marks ArcelorMittal's first partnership of this kind with an independent steel service centre in Poland. RBB is a long-standing customer of ArcelorMittal Europe – Flat Products and has been buying a wide range of ArcelorMittal products for more than two decades, including hot rolled and cold rolled coils, hot-dip galvanized products, and metallic coated products

In line with the recently signed MoU, RBB has booked its first order of hot-dip galvanized steel produced via the XCarb® recycled and renewably produced route. The product is also available with an independently verified Environmental Product Declaration (EPD).

ArcelorMittal Europe

THYSSENKRUPP MATERIALS SERVICES ACQUIRES SUSTAINABILITY MANAGEMENT PLATFORM PROVIDER

HMI of the sustainable management platform
(Picture: thyssenkrupp Materials Services)

thyssenkrupp Materials Services has announced the acquisition of WAVES, a provider of sustainability management platforms based in Luxembourg.

This strategic acquisition is an important step in expanding the sustainability product suite of pacemaker, a corporate venture of thyssenkrupp Materials Services. WAVES provides an advanced sustainability management platform (SMP) that helps companies calculate and manage their environmental, social and governance indicators along the entire supply chain. Companies can use the platform to monitor their sustainability performance in real time and proactively take measures to minimize negative environmental impacts. With WAVES' platform, pacemaker will enhance its proprietary carbon intelligence solution, which combines raw data, industry expertise, and machine learning algorithms to provide accurate emissions forecasts. The SMP is TÜV-certified and provides a comprehensive digital sustainability solution to help organizations meet the requirements of the EU Taxonomy and the Corporate Sustainability Reporting Directive (CSRD).

thyssenkrupp Materials Services

TATA STEEL UK AND JCB SIGN MOU FOR LOW-CO_2 STEEL

Tata Steel UK will supply the British construction equipment manufacturer JCB with green steel from Port Talbot after completing its transformation plans.

This is the first supply agreement Tata Steel UK has made since announcing the joint investment with the UK Government to transition to high-quality, low-CO_2 steel production in South Wales. The project includes building a new 3 million t/year state-of-the-art electric arc furnace (EAF), offering a lower-CO_2 alternative to the traditional blast furnace method.

The EAF, supplied by Tenova, will turn UK-sourced scrap into new high-quality steel, removing the need to ship millions of tonnes of iron ore and coal from across the world. Anil Jhanji Chief Commercial Officer, Tata Steel UK said: "One of the key drivers in our transition plans is that our long-standing and loyal customers such as JCB need green steel to meet their own decarbonisation ambitions."

JCB and Tata Steel UK have agreed on the supply of green steel produced at Port Talbot (Picture: Tata Steel UK)

JCB will integrate the steel into its machinery range. The company has led the way in decarbonisation in its industry, achieving many industry milestones, such as developing the first-ever electric mini-digger in 2018, creating the first hydrogen-powered machine in 2021 and continuously expanding its range of fully electric-powered equipment. It is currently putting the world's first construction machines powered by hydrogen combustion engines through rigorous testing.

Tata Steel / JCB

ALLEIMA TO SUPPLY STEAM GENERATOR TUBES FOR NUCLEAR POWER PROJECT

Korean nuclear fabricator Doosan Enerbility has ordered approximately 200 kilometers of steam generator tubes from Alleima. End-user NuScale Power will use the tubes for the construction of small nuclear reactors (SMR).

This is Alleima's second order from the nuclear fabricator Doosan Enerbility for NuScale Power's small nuclear reactors. Doosan is an EPC contractor offering a wide range of services ranging from the manufacturing of castings and forgings, power generation systems and desalination facilities to the construction of power plants.

NuScale Power's SMR technology has been certified by the U.S. Nuclear Regulatory Commission. The design is based on proven pressurized water-cooled reactor technology where Alleima's current steam generator tubing alloys are used.

Alleima

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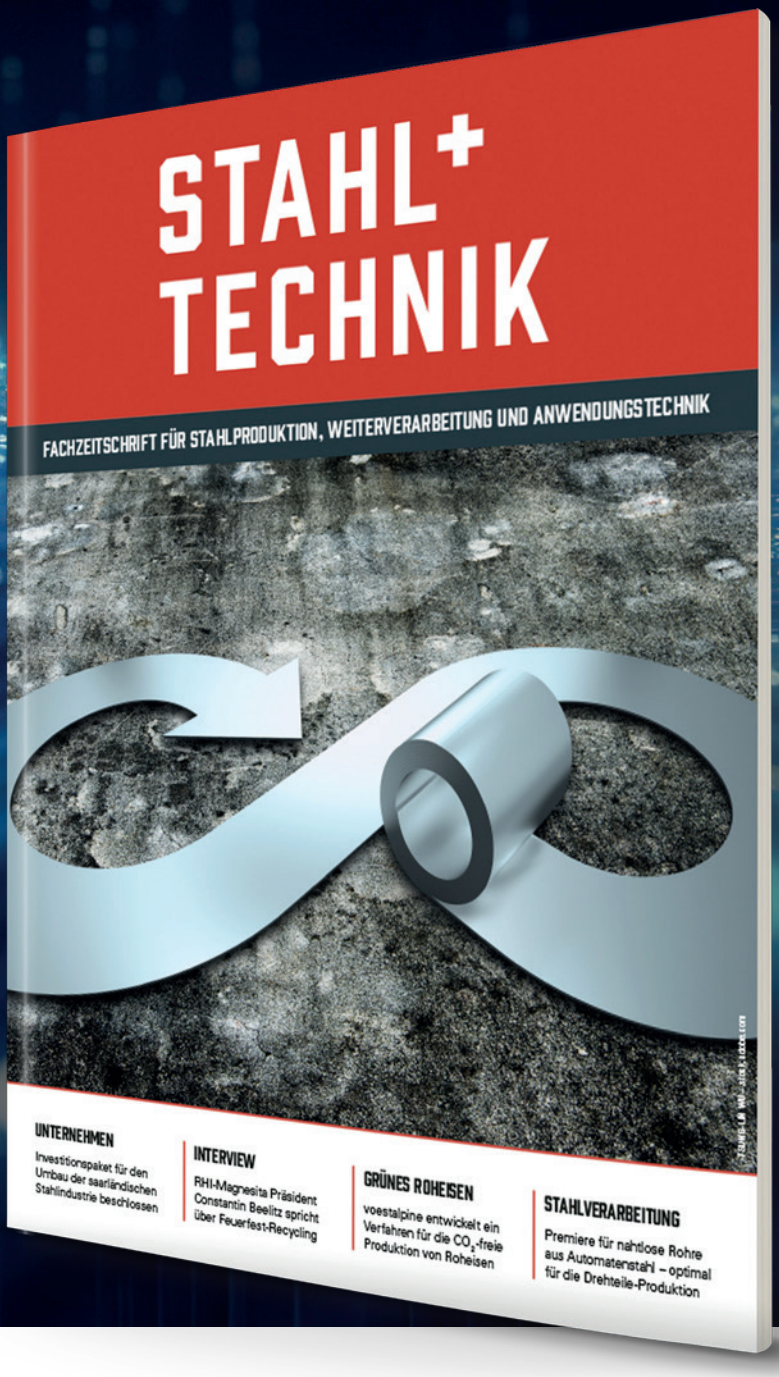

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DVS MEDIA

SUSTAINABLE ROOFING SOLUTION

Steel roof panels with significantly reduced CO_2 footprint

ArcelorMittal and Ateliers 3S have teamed up to launch a roofing profile with a significantly reduced CO_2 footprint. The "La Parisienne" trapezoidal sheet metal is made from XCarb® steel, which is recycled and produced using renewable energy sources, enabling and guaranteeing long-term durability.

From left: Julien Faisandier (CEO Ateliers 3S), Patrick Le Pense (Head of Business Development Construction at ArcelorMittal Europe - Flat Products), Jean-Christophe Vigouroux (Chairman FIMAVI Group), Gilles Lacroix (Key Account Manager ArcelorMittal Europe - Flat Products, Region North). (Picture: ArcelorMittal)

The French construction company Ateliers 3S has developed the product "La Parisienne", which emits 67% less CO_2 during production thanks to steel from ArcelorMittal.

The trapezoidal sheet "La Parisienne" is based on ArcelorMittal's Granite® Storm technology. It uses XCarb® recycled and renewably produced steel, manufactured from at least 75% steel scrap and melted in an electric arc furnace with 100% renewable energy. This results in a 67% reduction in the carbon footprint compared to the conventional blast furnace production method. In addition, Granite® Storm is free of hexavalent chromium and heavy metals. The wrinkled surface is valued for its non-slip properties and durability, which are guaranteed for 30 years.

"La Parisienne" is available in six colours, offering planners and architects a wide range of aesthetic options. Ateliers 3S has set itself ambitious environmental goals and plans to gradually convert its entire product range to using XCarb® steel from ArcelorMittal.

"We revisited a traditional recipe on one of the most tried and tested products in our business. Materials, coatings, design, we have worked on all the ingredients to make one of the most widely used roofing panel solutions a sustainable, high-performing and aesthetically pleasing choice; one that will continue to be as relevant in years to come as it has been in the past. For us as a construction company, the connection between design, functionality and climate protection is fundamental. We have been working with ArcelorMittal since our foundation. With the XCarb® Recycled and Renewably Produced steel, we can offer 'La Parisienne' as a product with a very low carbon footprint, while at the same time providing an aesthetically pleasing and competitive solution," explains Ateliers 3S managing director Julien Faisandier.

Patrick Le Pense, marketing manager at ArcelorMittal Europe – Flat Products says: "The fact that our CO_2-reduced XCarb® technology is being used in an increasing number of applications in a wide range of industries is a great vote of confidence for us. Even today, the possibilities for building in a way that is both modern and sustainable are already extensive.

And the trend is increasingly moving in this direction. The trapezoidal sheet metal "La Parisienne" is a prime example of how environmental protection and the circular economy can be incorporated into construction projects."

ArcelorMittal

> For us as a construction company, the connection between design, functionality and climate protection is fundamental.
>
> *Julien Faisandier, managing director at Ateliers 3S*

PIONEERING WORK IN THE ONSHORE WIND POWER SECTOR IN GERMANY AND EUROPE

Sustainable steel for German wind farm

Enercon, Salzgitter AG and TM Group have joined forces to reduce the carbon footprint of wind turbine towers. More than 70 percent reduction in CO_2e emissions can be achieved for every tower using low-emission steel.

Low-emission steel, often referred to as 'green steel', plays a significant part in reducing the environmental impact of wind turbines further. Wind turbine manufacturer Enercon, Ilsenburger Grobblech – a subsidiary of Salzgitter AG and TM Group company SMB Schönebecker Maschinenbau are cooperating to produce a lower-emissions steel tower, marking a further important step towards achieving more sustainability in the production processes of wind turbines. The steel tower components resulting from the collaboration will be used on an E-138 EP3 wind turbine at the Diepholzer Bruch wind farm project in Lower Saxony, Germany, in early 2025. This will make it one of the first onshore wind turbines in Europe – and the first in Germany – to feature a tower made from low-emission steel.

By working together with such strong partners from the steel industry, we are making significant progress in our mission to systematically and measurably integrate sustainability into our products and processes," says Stefan Frey, Enercon Global Procurement Director for Towers. "By pooling our expertise, we can reduce the CO_2e footprint of this steel tower by more than 70 percent. This cooperation provides us with an important basis from which we can offer our customers an even more sustainable tower option in future, while of course maintaining our high-quality standards and using state-of-the-art tower technology."

Wind turbines with a hybrid tower concept are made completely of steel. The bottom is composed of pre-edged steel plates, and the top of conical steel sections. This type of tower offers advantages both for installation and transport, particularly in view of increasing tower heights with even larger tower base diameters. In addition to this, steel is entirely recyclable.

Steel production is an energy-intensive process. To reduce greenhouse gas emissions in the production of heavy plates, Ilsenburger Grobblech is using physically CO_2-reduced slabs from its sister company Peiner Träger and another European partner company for this project. They are produced entirely from scrap in an electric arc furnace (EAF). Furthermore, the company is also focussed on using an energy mix with a significant share of renewable energies.

"We are working closely with strong research and industry partners to achieve a steel production that is as climate neutral as possible. We are therefore very pleased to be producing the first lower-emissions tower for a wind turbine in Germany together with Enercon and other companies from the steel industry," says Thorsten Gintaut, Managing Director of Sales at Ilsenburger Grobblech. "The Salzgitter Group is a leader in the transformation towards low- CO_2 production processes and steel products. With our SALCOS® – Salzgitter Low CO_2 Steelmaking – programme, we are working on replacing fossil fuels with hydrogen produced from renewable energies. The aim is to avoid the generation of CO_2 in the steel production process from the outset and thus enable us to reduce our overall CO_2 emissions by an estimated 95 percent by the end of 2033."

In its recently published sustainability strategy, Enercon reinforced its commitment to environmental and climate protection. "As a company we have set ourselves a target of reducing the intensity of indirect emissions by 40 percent by 2030," says Enercon Chief Operations Officer Heiko Juritz. "Lower-emissions steel will make an important contribution to reducing the environmental impact of wind turbines further. We are happy to be a trailblazer in the onshore market in Germany and Europe together with our partners."

Hybrid steel tower used for a wind turbine from Enercon (Picture: Enercon)

Enercon / Salzgitter AG / TM Group

DIE FORGING

Combined wheel and axle production line for Indian railways

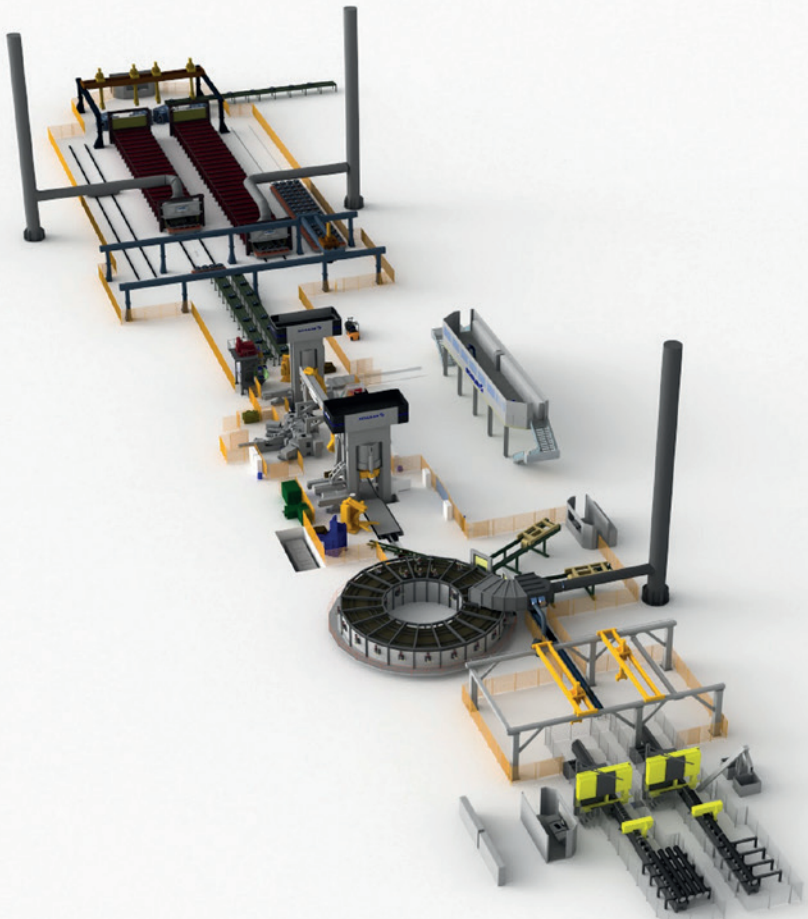
Jupiter Tatravagonka is investing in an integrated forging line to power India's premier integrated rail component facility. A new facility in the Odisha state in in Eastern India, planned for a significant capacity expansion to Jupiter Tatravagonka Railwheel Factory, is expected to be fully operational by 2027.

India is one of the fast-growing economies in the world. To address the nation's increasing needs, the transportation network needs to be re-aligned. Jupiter Tatravagonka, a freight wagon manufacturing joint venture between Jupiter Wagons Limited (JWL) and Tatravagonka a.s. (Slovakia), has awarded a contract for a turnkey wheel and axle production line to international technology group Andritz and its subsidiary Schuler. The project has been announced at the inauguration of the new entity Jupiter Tatravagonka Railwheel Factory in Chhatrapati Sambhaji Nagar in September 2024. The new facility in Odisha, planned for a significant capacity expansion to Jupiter Tatravagonka Railwheel Factory, is expected to be fully operational by 2027.

The entry into the forging business of Jupiter Tatravagonka marks a key moment in the development of the JV. The new production line will enable the company to manufacture critical components such as wheels and axles for its railway wagons in-house. "This investment underlines our vision of innovation and excellence as we aim to deliver world-class products to global markets strengthening our position as a global leader in rail component manufacturing," says Vivek Lohia, Managing Director of Jupiter Wagons, highlighting the strategic significance of this expansion. "Driven by factors such as growing e-commerce, increasing industrial activity and the government's push into infrastructure development, the demand for reliable freight transport is at an all-time high. Our goal thereby is to meet these demands while setting new benchmarks in quality and efficiency."

However, approximately 50 percent of the production capacity is dedicated to exports. The JV's integrated forging line will enable Jupiter Wagons to streamline production processes while ensuring superior quality control and timely availability of critical components.

Schuler



> The demand for reliable freight transport is at an all-time high. Our goal thereby is to meet these demands.
>
> *Vivek Lohia, Managing Director of Jupiter Wagons Limited*

The combined wheel and axle forging line for the Jupiter Tatravagonka joint venture will comprise a rotary hearth furnace, forging press, trimming press and highly automated material handling solutions (Picture: Schuler)

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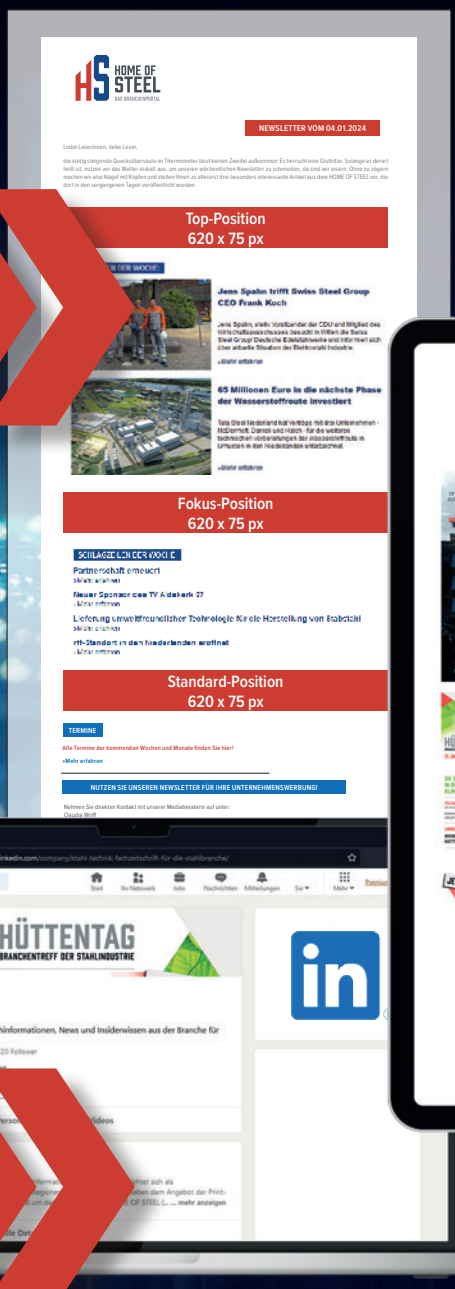

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PRESERVING HERITAGE THROUGH INNOVATION

Steel skeleton for the historic Vasa ship

The Vasa Museum faces its biggest challenge since the salvage. With the wood weakened, the ship needs a new support. Several years of research and advanced testing at the museum have led to a unique collaboration with Alleima to develop an internal, custom-made steel skeleton to support and stabilize the ship.

The collaboration entails that Alleima becomes the main partner of the Vasa Museum and the "Support Vasa" project
(Photo: Christopher Nielsen)

The Vasa ship is a unique piece of cultural heritage in the world, displayed at the Vasa museum in Stockholm, capital of Sweden. But despite its impressive size, the Vasa ship is very fragile. Chemical degradation of the wood has caused the hull, which was built from oak in the 1620s, to lose much of its strength. These small movements can have major consequences in the long term. In collaboration with the Vasa Museum, special steel company Alleima is providing its world-leading expertise and high-alloyed SAF™ 2507 super-duplex stainless steel material for a customized inner steel support for the Vasa ship.

Specific material to be used

"The inner steel support will extend from the keel to the upper deck. It will help support the loads from the deck and deck beams, slowing the downward movement of the hull. Therefore, the inner steel support must be built from a material that is both strong and light. Thanks to Alleima's special steel, we do not have to drill as many holes in the Vasa's hull as would otherwise have been necessary. This is incredibly important for us from a preservation perspective. We estimate that we only have to make about half as many holes in the hull as otherwise would have been necessary," says Magnus Olofsson, project manager of "Support Vasa".

The inner steel skeleton is built as a truss with tubes. This solution stabilizes the hull, slows down the movements of the ship and distributes the load.

"Alleima's advanced stainless steel and special alloys are found in the most demanding environments and applications in the world. This material has very high strength, which means that less material is needed for the construction, reducing the weight of the inner steel skeleton. The high corrosion resistance allows the material to come into direct

The inner steel skeleton is built as a truss with tubes to stabilize the hull, slow down the movements of the ship and distribute the load (Picture: Alleima)

contact with the ship without being affected by the acid that the wood gives off," says Tom Eriksson, Executive Vice President and Head of Strategic Research at Alleima.

Ongoing cooperation between Alleima and the Vasa Museum

"We are proud to contribute to preserving the Vasa ship for the future. This historic project reflects our commitment to innovation and sustainability. The project is unique in both implementation and procurement and shows the power of long-term partnerships between companies and cultural institutions," says Elja Nordlöf, Executive Vice President and Head of Communications at Alleima.

The work to construct Vasa's inner steel support is due to be completed by 2028, just in time for the ship's 400th anniversary.

This is not the first time Alleima has collaborated with the Vasa Museum. In 2011, the Vasa Museum and Alleima, then owned by Sandvik, began a long-term research and development collaboration to save the national treasure by replacing the Vasa ship's more than 5,000 rusty bolts. They were then replaced with specially developed, high-alloy bolts. Thanks to the bolts, the Vasa ship was not only more stable, but also eight tons lighter, which is equivalent to the weight of a full-grown elephant!

Alleima

A brief history of the Vasa

On August 10, 1628, the Swedish warship Vasa cast off from its berth below Tre Kronor castle and slowly left the harbor. It was a mighty ship with three masts that could carry ten sails, measured 52 meters from tip to keel, was 69 meters long and weighed 1,200 tons. However, a gust of wind caused the Vasa to capsize, and the water poured in through the open gun ports, causing the Vasa to sink. At least 30 of the 150 or so people on board died. 333 years later, divers found the Vasa at the bottom of the sea, and on April 24, 1961, the ship was salvaged with more than 14,000 loose pieces of wood. Since the salvage, however, work has been carried out step by step to preserve the ship. The Vasa was initially housed in a temporary structure before the Vasa Museum opened in 1990 and has become one of the most visited museums in Scandinavia.

The next issue of STAHL + TECHNIK in German will be out in April covering the following topics:

REFRACTORIES

Special section on refractories for the steel industry

Dr Rainer Gaebel, President of the World Refractories Association (WRA), Deputy Chairman of the German Refractories Industry Association and Managing Director of the Refratechnik group speaks about the challenging shortage of skilled workforce – Dr Kerstin Hauke from the German Refractories Research Association explains how the refractories sector is breaking new ground to specifically promote female specialists with the 'women@refractories' initiative – Research into interactions between refractory materials and hydrogen at RWTH Aachen University

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Oxyfuel burner successfully installed on walking beam furnace

ArcelorMittal Duisburg site in Germany has taken another step towards greater efficiency and sustainability by implementing oxyfuel burners at the walking beam furnace in the wire rolling mill. In addition to the reduced environmental impact due to lower natural gas consumption and lower CO_2 emissions, this investment also makes the walking beam furnace future-proof and 'hydrogen-ready'.

STEEL PROCESSING AND APPLICATION

Sustainable reinforcing steel with a transparent CO_2 footprint

The construction industry is faced with strict environmental regulations and growing pressure to reduce the carbon footprint of new buildings by using sustainable building materials. The new rebar STOOX PCF provides a climate-friendly solution. The material displays its real carbon footprint setting clear targets for CO_2 reduction in construction projects.

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02.01 Ore dressing

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03 Iron making

03.01 Blast furnaces

1150 Heat recovery systems

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03.02 Direct reduction plants

1160 Direct reduction plants

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04 Steelmaking

1668 Equipment for steelmaking plants

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04.04 Electric steel plant

1875 Electric arc ladle furnaces

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04.07 Secondary metallurgy

2028 Equipment for chemical heating

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2030 Argon purging equipment

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04.07 Secondary metallurgy

2080 Ladle metallurgical plants

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2110 Secondary metallurgical plants

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2120 Steel degassing plants

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2130 Steel desulfurization plants

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2140 T+P lance equipment

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04.09 Components

2182 Burning lances (oxygen) for tundish and ladle gate valves

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2270 Injection plants for argon

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04.09 Components

2440 Handling equipment for oxygen/carbon lances

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2490 Coal dust injection lances

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07 Hot rolling

07.10 Components

4430 Decoilers and rewinders

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08 Forging, extrusion

08.03 Components

5150 Forging manipulators

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10 Cold rolling

10.01 Cold rolling mills

5490 Strip, sheet, cold and metal rolling mills

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49824 Ringe/Neugnadenfeld, Germany
☎ +49 5944 9301-0
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10.04 Annealing lines

5670 Annealing lines

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11 Surface treatment

11.04 Surface treatment plants

6270 Strip edge trimming

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11.04 Surface treatment plants

6280 Strip processing and finishing lines

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11.05 Aluminizing, tin plating, galvanizing

6630 Hot dip galvanizing lines

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14 Sheet metal processing

14.03 Welding technology

8120 Strip welding machines

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8205 Laser welding machines

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14.03 Welding technology

8330 Welding machines, general

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16 Furnace and energy technology

10170 Furnace optimization (conversion to low NOx combustion)

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Internet: www.flox.com

10190 Rational use of energy

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16.02 Forging furnaces

10230 Forging furnaces

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16.03 Roller Hearth Continuous Furnaces

10260 Roller Hearth Continuous Furnaces

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10270 Roller hearth and walking beam furnaces

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16.05 Top-hat furnaces

10310 Top-hat furnaces

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16.08 Heating furnaces and heat treatment plants

10408 Continuous furnaces

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10410 Co-step furnaces

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10430 Bogie hearth furnaces

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16.08 Heating furnaces and heat treatment plants

10510 Roller hearth and walking beam furnaces

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10540 Pusher-type, roller and rotary hearth furnaces

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10560 Heat treatment plants

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10562 Heat treatment furnaces (continuous and discontinuous)

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10570 Heat treatment furnaces for batch operation, open heated

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16.09 Bath furnaces

10580 Aluminum melting furnaces

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16.13 Components

10890 Natural gas burners

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Internet: www.flox.com

11010 Regenerative burners

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Internet: www.flox.com

11020 Recuperative burners

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Internet: www.flox.com

16.13 Components

11070 Radiant tube burners

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18 Machinery and plant engineering

12210 Plant engineering, general

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18.06 Ventilation plants and equipment

12660 Air conditioners for heat plants

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12670 Air conditioners for crane lances, crane bridges, etc.

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☎ +49 7520 914820
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Internet: www.frigortec.com

18.10 Power and work machines

13070 Piston pumps

HYDROWATT AG
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☎ +41 52 624 53 22
E-Mail: info@hydrowatt.com
Internet: www.hydrowatt.com

18.10 Power and work machines

13160 Vacuum pumps

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21 Measuring and testing technique

21.02 Measurement of physical properties

16608 Strip thickness control (AGC)

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Internet: www.polytec.de

21.02 Measurement of physical properties

16652 Dressing degree and mass flow measuring systems

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Internet: www.polytec.de

21.02 Measurement of physical properties

16830 Speed measuring devices

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21.02 Measurement of physical properties

16910 Length measuring devices for tubes

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16950 Length and speed measuring systems (optical)

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16960 Laser speed and length measuring systems

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24 Environmental protection and disposal

24.01 Dedusting and gas cleaning

18360 Exhaust gas cooling systems

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18400 Treatment of dusts from steel mills and foundries

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