Issue February 2020

STEEL+ TECHNOLOGY

01/20

THE TECHNICAL MAGAZINE FOR IRON AND STEEL PROFESSIONALS AROUND THE WORLD

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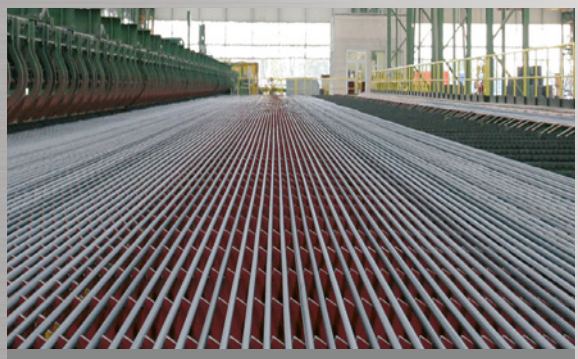

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What the new decade holds in store for steel

Arnt Hannewald, Dipl.Ing.
Editor

The last few months have seen political discussions about climate change and about the need to reduce GHG emissions heat up everywhere. In the steel sector, global players and particularly the European steel companies have hastened to state they intend to be carbon neutral by 2050, while setting interim CO_2 reduction targets for 2030. In this issue of STEEL + TECHNOLOGY, we are featuring examples of roadmaps set out by major steel companies in Europe. Among these, Nordic steel company SSAB has the most ambitious target: they want to be the first steelmaker to market fossil-free steel as early as by 2026.

Edwin Basson, Director General, worldsteel, has summarized the environmental challenge the global steel industry is facing in a recent post on "Steelblog": "We as an energy intensive sector with hard-to-abate CO_2 emissions will have to clearly explain why decarbonising the global economy will be a steel-intensive process. It will partly depend on our 100% and infinitely recyclable material. We will also have to communicate the capital-intensive and technically demanding work our members are doing in developing breakthrough technologies that will see virgin steel produced with net zero carbon. (….) Our industry is already making headway in responding to these new pressures, but there remains much to do. Fortunately, both the steel industry and steel as a product already play an important role in driving the sustainability that society expects."

In this context, I was recently asked if our magazine will have any upcoming issues focusing on the reduction of the carbon footprint in ironmaking and steelmaking. Obviously, the answer was "yes, actually in every issue", since we certainly want to have our finger on the pulse of the exciting developments currently taking place in our industry. There is no way around this topic, neither for the steel companies nor for the media. In the same line, we feature modernization projects of blast furnaces, greenfield projects for new steel works, new technologies for strip processing lines and much more – all of which have significant potential to reduce carbon footprints.

However, 2020 has started with an unforeseeable serious issue – the Wuhan coronavirus outbreak. This conjures up memories of the SARS epidemic in 2002/2003, which is said to have caused approx. US$ 50bn of damage to the global economy. Repercussions of the new coronavirus on the economy may become even more severe. The outbreak is likely to slow Chinese growth, with global consequences that will not leave the steel industry unaffected. The economic risks of epidemics are not trivial. Nevertheless, economic risks should never overshadow the suffering of the sick and families mourning their loved ones. That we must not forget.

DANIELI

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PROCESS CONTROL SYSTEMS

Danieli Automation automates plants through integrated systems for equipment, process and power control, handling jobs from order placement through product delivery. Event-prediction and problem-solving operator assistance are ensured by the innovative 3Q system.

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Danieli Environment offers a full range of proprietary technologies for air pollution control, water treatment, solid waste recovery, noise reduction and energy savings.

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Through planning, complete systems integration and construction with our own heavy lifting equipment, provide our teams with full operational flexibility. Danieli Engineering and Danieli Construction International: your trusted partner with 37 years of experience in on-time project delivery and cost management.

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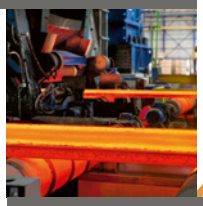

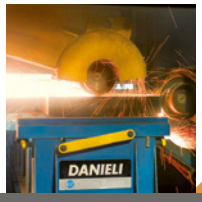

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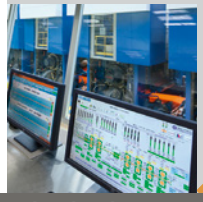

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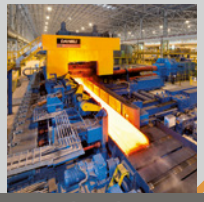

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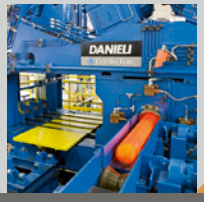

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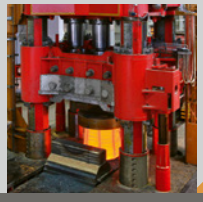

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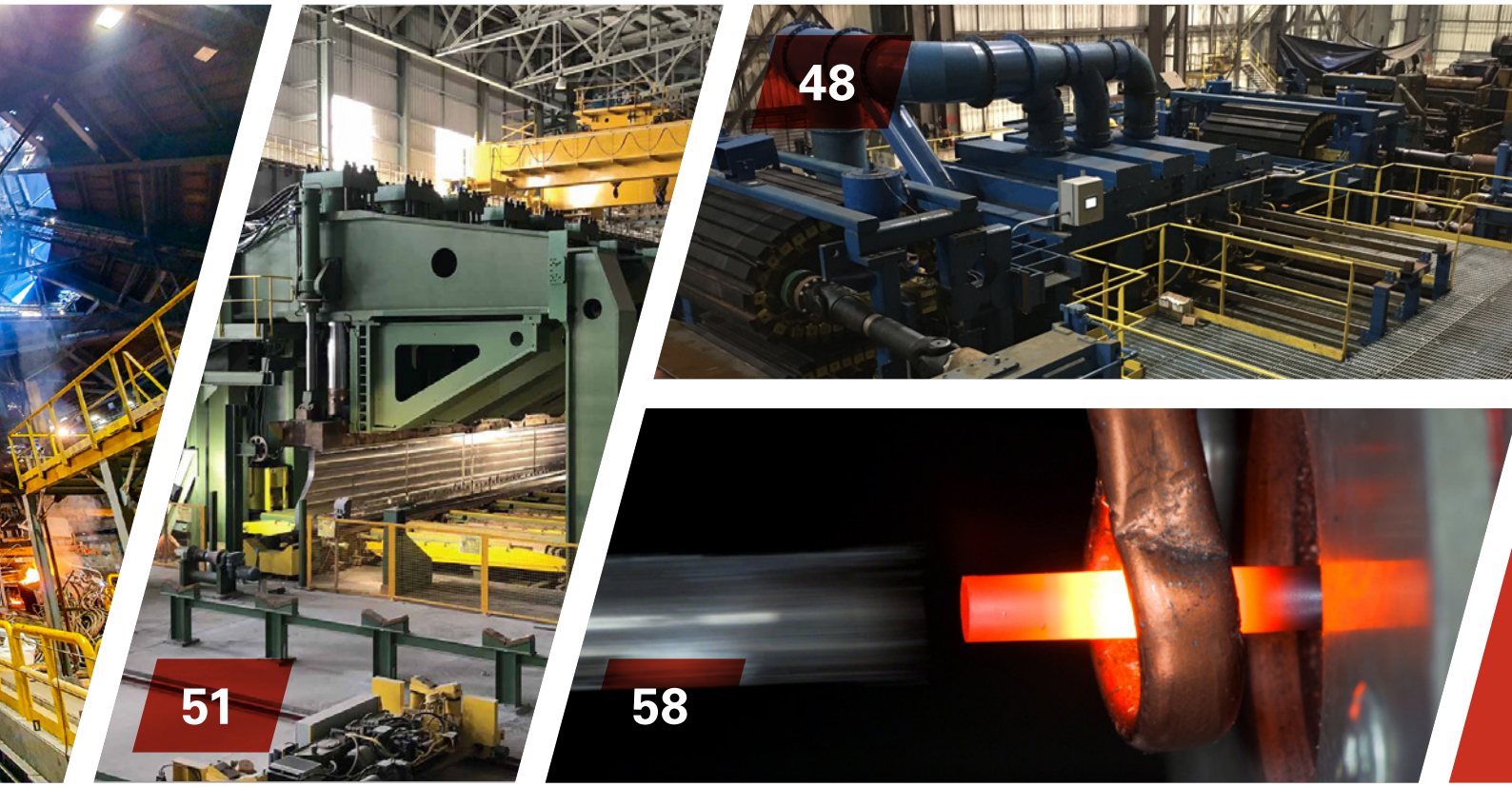

Steel distribution

Columns

Cover picture:
Midrex Technologies, Inc.

Pictured: LGOK HBI-2 and HBI-3 MIDREX® Plant. Hot briquetted iron (HBI) is a premium form of direct reduced iron (DRI). HBI is commonly used in EAF's, but is increasingly used in blast furnace production to increase productivity while lowering emissions. The product can also be used in the BOF as a coolant.

Digital Alloys takes new chief technology officer on board

Digital Alloys, provider of metal additive manufacturing, has announced the addition of Carl Calabria as its chief technology officer.

Carl Calabria is a veteran of the additive manufacturing industry. He joins Digital Alloys from Formlabs, provider of plastic 3D printers, where he was head of engineering. At Digital Alloys Calabria will have overall responsibility for both research and engineering. His move will speed the release of Digital Alloys' Joule Printing™ metal additive manufacturing technology, which delivers metal printing solutions that have the speed, cost and quality needed for volume manufacturing of larger parts.

Digital Alloys

ESTAD appoints chairman of scientific advisory board

Göran Carlsson has been named chairman of the scientific advisory board in the run-up to the 5th ESTAD Conference staged in Stockholm on from 14 to 18 June 2021.

Göran Carlsson has worked in the steel industry and with R&D for most of his career. His latest position was that of CEO of the new steel research institute SWERIM, a merger of MEFOS and Swerea KIMAB. He worked for SSAB for many years during a time where he also was associated professor in process metallurgy at Luleå Technical University.

The ESTAD (European Steel Technology Application Days) conference has become established as an important meeting place for steel producers, steel users, plant suppliers, research institutes, as well as universities. In 2021, the conference will be hosted by Jernkontoret.

Jernkontoret

New CEO at Steeltec

Effective January 1, 2020, Dr. Florian Geiger took over as the new CEO of bright steel producer Steeltec, a company of the Schmolz + Bickenbach Group.

Florian Geiger succeeds Gerd Münch as CEO, who decided to step down from his role on December 31, 2019. Gerd Münch spent a total of 28 years with the company, including 14 years as chief executive officer. Florian Geiger joined Schmolz + Bickenbach in 2013 as vice president for business development, with responsibility for enterprise-wide strategic projects and for mergers and acquisitions. Among other achievements, he led the negotiations for the creation of a joint venture in China and for the acquisition of Ascometal in France.

Dr. Florian Geiger is the new chief executive officer of Schmolz + Bickenbach group company Steeltec (Picture: Steeltec)

Schmolz + Bickenbach

Tata Steel in Europe names new chief commercial officer

Karl Haider has taken up the role of chief commercial officer for Tata Steel in Europe. He succeeds Henrik Adam who became CEO of Tata Steel in Europe in June 2019.

Haider joined Tata Steel in Europe in 2011 as director Downstream Operations. He began his career in the steel industry as an apprentice at voestalpine in 1981. Eventual he was a member of the executive board of the High Performance Metals division of voestalpine.

Tata Steel

thyssenkrupp Schulte reorganizes management board

Effective January 1, 2020, Detlef Schotten became chairman of the board of management of thyssenkrupp Schulte. As of the same date, Dr. Tobias Hegmanns joined the company as chief operating officer.

Detlef Schotten succeeds Martin Stillger who has been appointed chairman of the executive board of thyssenkrupp Materials Services. In addition, Detlef Schotten has taken over responsibility for the Western Europe operating unit from Stillger. Schotten has more than 25 years of experience in various management and executive functions at thyssenkrupp.

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Detlef Schotten is the new chairman of the board of management of thyssenkrupp Schulte (Picture: thyssenkrupp Schulte)

Tobias Hegmanns had been responsible for the global supply chain management unit of thyssenkrupp Materials Services since 2016 and the central technology, innovation & sustainability function since 2019. In addition to Detlef Schotten and Tobias Hegmanns, Michael Labodt as chief sales officer and Peter Zarth as chief financial officer now form the management board of thyssenkrupp Schulte.

thyssenkrupp Schulte

NLMK appoints vice president for investment projects

Dmitry Sotnikov succeeds Konstantin Lagutin as vice president for investment projects (Picture: NLMK)

NLMK has named Dmitry Sotnikov as NLMK Group vice president for investment projects.

Following the decision by Konstantin Lagutin, NLMK's previous vice president for investment projects, to step down from the position, Dmitry Sotnikov has been selected as his successor.

Prior to joining NLMK Group, Dmitry Sotnikov headed a development company that executed the construction of a business park in Moscow, a residential complex in Yekaterinburg, and a business centre in Perm, among other large-scale projects. Prior to 2011 and for almost a decade, Dmitry held various investment and operational management positions at Evraz.

NLMK

Executive changes at thyssenkrupp Materials Services

Martin Stillger is the new chairman of the executive board of thyssenkrupp Materials Services (Picture: thyssenkrupp Materials Services)

Following the appointment of Dr. Klaus Keysberg to the executive board of thyssenkrupp AG, the board of the thyssenkrupp Materials Services business area is being partly restructured.

Martin Stillger succeeds CEO Dr. Klaus Keysberg as chairman of the executive board of thyssenkrupp Materials Services, who moved to the executive board of thyssenkrupp AG. Martin Stillger has held various leadership and management positions at thyssenkrupp Materials Services since 2008 – most recently as CEO of thyssenkrupp Schulte and the Western Europe and Technical Services operating units.

In addition to the new role of chairman for Martin Stillger, Ilse Henne, who was appointed chief operating officer on January 1, 2019, has taken on the new position of chief transformation officer. The role of chief operating officer will no longer be filled.

thyssenkrupp Materials Services

New nominations to Nucor board of directors

The Nucor board of directors has elected Leon J. Topalian as a director and John H. Walker to serve as its non-executive chairman.

Leon J. Topalian has been chief executive officer of Nucor since January 1, 2020. From 2017 to 2019, he served as executive vice president and from 2013 to 2017 as a vice president of Nucor. John H. Walker has served as a member of Nucor's board of directors since 2008. He has been employed by Nucor in various capacities since 1996, including serving as general manager at two of Nucor's facilities, in Arkansas and Illinois.

Nucor

Hybrit appoints new managing director

Hybrit Development AB, owned by SSAB, LKAB and Vattenfall, has appointed Eva Vitell as the new managing director.

Hybrit Development is a joint venture between the steel manufacturer SSAB, the mining company LKAB and the energy company Vattenfall. The objective of the joint venture is to develop the world's first fossil-free, ore-based steelmaking process. The project started in 2016 and the goal is to have an industrial process in place by 2035.

In her new role, Eva Vitell will drive development work, develop the organization and ensure that the ambitious schedule for Hybrit remains on track. Eva Vitell joins Hybrit Development from Vattenfall Electricity Distribution, where she was responsible for customers and market.

Hybrit Development

On 1 February, Eva Vitell took up her new role as managing director at Hybrit (Picture: Hybrit Development)

BRAZIL

Gerdau and SKF establish partnership to improve mill productivity

Gerdau and SKF have signed an agreement aimed at increasing productivity and reducing unplanned downtime at Gerdau's Charqueadas and Araçariguama steel mills.

The fee-based agreement will see SKF provide a full range of products, including bearings, remanufacturing, lubrication systems and connected condition monitoring units. Data from critical machinery at the two steel mills will be analyzed at SKF's Rotating Equipment Performance Center in Brazil. Based on this analysis, SKF and Gerdau can plan maintenance and corrective actions, improving machine reliability and performance.

Claudinei Reche, president, SKF Latin America, says: "By offering customers in the steel industry the opportunity to work with us on a fee-basis, we give them access to our full competence around the rotating shaft, in order to help them improve their output and reduce their consumption of bearings, grease and energy."

SKF

Condition monitoring of rotating shafts in steel mills is just one of numerous measures aimed at improving mill performance (Picture: SKF)

CANADA

Algoma Steel to modernize wide plate mill

Danieli is going to upgrade the 4,200 mm wide plate mill of Algoma Steel in Sault Ste. Maire, Ontario.

The project will allow Algoma to expand its product portfolio to include wider plate products, to better control shape and surface quality and to improve logistics – making it possible to offer enhanced on-time shipment performance. The plant will be completely re-automated by Danieli Automation from Level 0 through to Level 2. Along with new process equipment and new digital drives, this will allow Algoma to perform normalized - or controlled - rolling, so that it can supply new grades of plate to the shipbuilding, energy and bridge building sectors. Danieli Taranis will provide engineering and post-commissioning support.

Danieli's scope of work will include an overhaul of the complete plant automation

The upgrade of the wide plate mill will allow Algoma to add new grades to its portfolio (Picture: Danieli)

system - from the reheat process to finished goods - and the installation of a new primary de-scaler, a new hot-leveler and a new cooling bed. A new dividing shear, piling system, automated inspection system and plate marking machine will upgrade the finishing area. Work began in October 2019 and is scheduled to be concluded in the summer of 2021. All work is scheduled to be carried out in stages during routine downtime, ensuring no impact to operations or shipments.

Danieli

USA

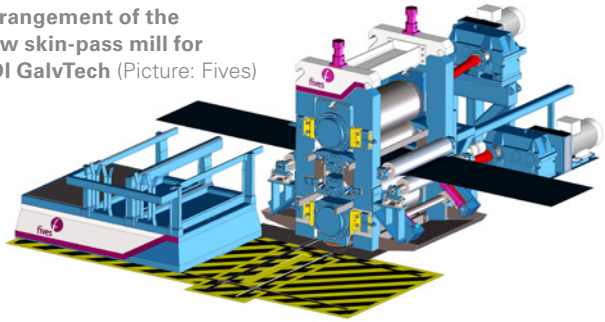
GalvTech orders new skin-pass mill

Steel Dynamics, Inc. (SDI) has placed an order with Fives for the supply of a high-efficiency skin-pass mill to its GalvTech facility in Pittsburgh, Pennsylvania.

For high-quality strip finishing, a skin-pass mill is essential to remove the yield-point elongation effect and improve surface roughness and flatness.

The DMS SkinPass 4Hi to be supplied by Fives will be designed to improve performance and surface quality of a continuous galvanizing line. The wet-process-type mill will have a maximum rolling force of 5,500 kN and incorporate various innovative design features, such as optimum rolling and bending forces, limited deflection for reduced friction, better control and higher mill rigidity, automatic clamping, easy maintenance, exceptional component life and quick work roll change. Given the limited line footprint, the inclusion of the skin-pass and the arrangement of a new bridle roll between the skin-pass mill and the tension leveller was an engineering challenge well mastered by Fives.

Fives



Arrangement of the new skin-pass mill for SDI GalvTech (Picture: Fives)

USA

Moog to acquire GAT

Moog Inc. has completed the acquisition of Gesellschaft für Antriebstechnik mbH and GAT Inc.

Moog Inc. is a worldwide designer, manufacturer, and integrator of precision control components and systems. Moog's high-performance systems control military and commercial aircraft, satellites and space vehicles, launch vehicles, missiles, automated industrial machinery, marine and medical equipment.

Headquartered in Geisenheim, Germany, GAT is a world leader in the design and manufacture of high-end fluid rotating unions and slip rings. The company's products are used in a variety of applications including specialty industrial machinery, machine tools, steel mills, medical products, wind turbines, and semiconductor fabrication.

According to Moog, the GAT product offering, engineering expertise and manufacturing capability complements Moog's core slip ring business, expands its offering into fluid rotary products and allows Moog supply fully integrated slip ring/rotary union solutions

Moog

North American Stainless grants FAC for new torque retainer installed at AOD converter

SMS group has received the FAC for the installation of a torque retainer at North American Stainless' (NAS) 160 t AOD converter No. 1.

The installation of the torque retainer reduces the torque that had previously been causing uncontrolled vibrations and damage to the bull gear, bearings and foundations of the converter drive during AOD converter operation. The target values were achieved under production conditions shortly after commissioning.

SMS group supplied the torque retainer as a compact electrohydraulic unit. The electrical and automation systems were adapted specifically to the customer's needs. The scope of supply also included the engineering, supervision of installation work, and technical assistance during commissioning.

As a result of the new torque retainer, availability and operational reliability of the AOD converter have been significantly improved, gear unit maintenance will be much lower in the future and North American Stainless is now able to utilize larger tuyeres to increase the blowing rate.

SMS group

NioCorp to establish superalloys materials facility

NioCorp is developing a superalloy materials project in Southeast Nebraska that will produce niobium, scandium, and titanium.

The proposed Elk Creek Superalloy Materials Project is located entirely on private lands. NioCorp Developments has secured legal agreements with landowners on land planned for use as part of the project. In the event that sufficient project financing is obtained, the company intends to negotiate extension agreements on other land parcels as required by the construction schedule of its proposed project.

NioCorp Developments

North Star BlueScope Steel to build single-strand continuous caster

North Star BlueScope Steel, located in Delta, Ohio, has selected SMS group as the supplier for its new single-strand thin-slab continuous caster.

The new casting machine will have a thickness range of 95 to 110 mm and a width range of 900 to 1,595 m. It will allow North Star BlueScope Steel to increase thin-slab production from 2.2 million to over 3.3 million t/year. SMS group's scope of supply will comprise the complete cast floor equipment, including the ladle turret, the mould and the vertical-bending containment zone, and a pendulum shear to cut the strand into slabs. To digitalize the casting process, SMS group is going to supply a range of innovative technology packages. The new casting machine will be equipped with X-Pact® Width Control, X-Pact® Solid Control that includes width-dependent air-mist secondary cooling and solidification control, Level 2 X-Pact® Cast Optimizer and the HD moldTC mold monitoring system. SMS digital will supply the SMS Data Factory digitalization package. The anticipated start-up of the new caster is set for 2021.

SMS group

Nucor Steel Arkansas to build new coil paint line

Nucor Corporation's board of directors has approved an expansion project which will add a coil paint line at the company's sheet mill in Mississippi County, Arkansas.

Nucor Steel Arkansas opened in 1992 and produces approximately 2,600,000 t of

hot-rolled sheet steel for automotive, appliance, construction, pipe and tube and many other applications. The recently approved capital investment will allow the mill to build a high-quality continuous coil coating line that will have a thickness range of 0.25 to 1.65 mm and widths of 890 to 1,830 mm. The new coil paint line will have a capacity of 250,000 t/year and is expected to start up in the first half of 2022.

Nucor Steel Arkansas recently completed construction of a new speciality cold mill complex and is currently building a new galvanizing line which will begin operating in 2021.

Nucor Corporation

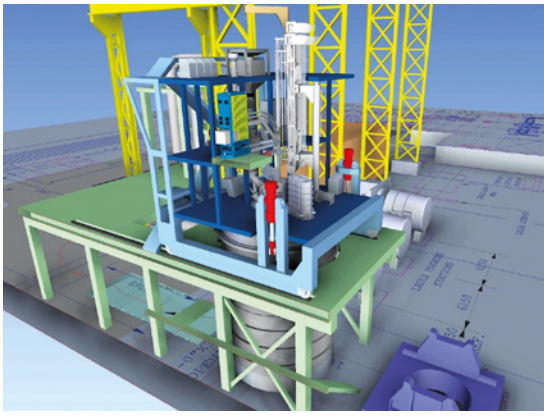
Nucor Steel Darlington places order for vacuum degassing unit and chemical energy package

INTECO has received an order from Nucor Steel to supply steel refining technology to Nucor's Darlington mill in South Carolina.

Nucor's order to INTECO encompasses a single-station vacuum degasser with a capacity of 110 t, equipped with a mechanical vacuum pump system. This ensures short pump-down times and pressure curves adapted to each steel grade. A special feature is the design of the vacuum cover with a central socket for all kinds of access such as sampling, temperature and hydrogen measurement. The first heat is scheduled to be processed by the end of 2020.

In addition to this contract, Nucor will equip the steel mill in Darlington with INTECO's automatic gas coupling system. And by March 2020, a chemical energy package including JetBOxes™ and burners for Darlington's Consteel EAF will be installed by INTECO.

INTECO



Vacuum degassing facility of the type to be installed at Nucor Steel Darlington
(Picture: INTECO)

USA

Nucor Steel Gallatin commissions new pickling and galvanizing line

Pickling and galvanizing of the first coil in September 2019, marked the production start of the new pickling and galvanizing line supplied by SMS group to Nucor Steel Gallatin in Ghent, Kentucky.

SMS group had delivered the complete line as a full-line supplier responsible for the engineering, process technology, furnace technology, pickling and galvanizing technology, and electrical and automation systems. The "heat-to-coat" technology implemented in the line is characterized by a compact, operator-friendly U-shape design, featuring a turbulence pickling system, a high-power inductive heating system, FOEN® galvanizing equipment and a Drever after-pot cooling system.

The line is designed to produce 500,000 t/year of galvanized hot strip with a maximum throughput rate of 180 t/h and a large strip cross section of up to 6.35 mm thickness and up to 1,854 mm width.

The first pickled and galvanized hot strip coil produced at Nucor Steel Gallatin in September 2019 (Picture: SMS group)

SMS group

Nucor Steel Kankakee to install new caster and secondary metallurgy station

Danieli will supply a new 9-m-radius, 4-strand caster to Nucor Steel Kankakee's facility in Bourbonnais, Illinois.

The caster will be used to produce commercial grades, low-carbon, peritectic and medium-carbon grades. The maintenance-free fast cast cube oscillator with Hy-Power actuator will optimize casting stability, and hence product quality, while substantially improving caster up-time by reducing maintenance activities. The oscillator will be installed on a retractable car, further increasing overall plant availability by reducing downtime during format changes. The casting machine will be designed for future implementation of submerged casting capability in order to improve steel cleanliness.

The new stirring station will be installed in line with the EAF tapping car. The use of a hot metal crane will be minimized thanks to an operator-friendly layout with C-shape cars and automatic ladle lifting system. Ferroalloys will be automatically fed at the stirring station through a dedicated material handling system designed to be upgraded in the future in order to add automatic tapping functions.

The new stirring station will be equipped with an automatic stirring lance, with motorized dispenser and automatic sampling manipulator to enhance safety of the operators. The project includes new Level 1 and Level 2 automation with the Q-CAST process supervisory system featuring real time quality assessment, automatic cutting optimization and a tundish-mixing steel prediction system for metallic yield optimization.

Danieli

Steel Dynamics completes rolling mill expansion

After the successful completion of the rolling mill expansion by Danieli, the new billet welder and spooler line at Steel Dynamics, Columbia City, have been producing spooled coils up to 5 t in endless mode.

Among the main equipment supplied by Danieli is a 70 m conveyor connecting the existing medium section mill to the new spooler line, a 3-MW induction furnace to heat the stock coming from the existing

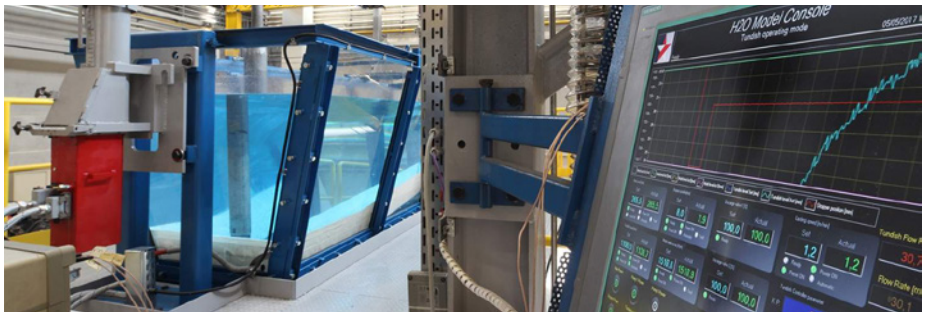
At Steel Dynamics, the new spooler line connects to the medium section mill (Picture: Danieli)

mill, six housingless SHS 180 rolling stands complete with a table for quick stand-changing, a 6-pass Delta-type finishing block driven by a low-voltage 2.5 MW motor, and finishing services. Different cooling set-ups are implemented for the bar head and tail by means of the Level 1 automation system while the perfect and regular distribution of the hot-rolled bar is achieved by the Q-VID Spool. The mill started up seventeen months after the contract award date.

Danieli

U. S. Steel to upgrade slab caster with new flow technology

Danieli is going to convert the C Line caster at U. S. Steel's Gary Works to new flow technology.



Tundish stopper-rod control system. (Picture: Danieli)

At the end of 2016 U. S. Steel entrusted Danieli to replace the stopper-rod control system together with the mould-level control sensors and automation at its Great Lakes and Gary Works. Both plants, which operate one double-strand slab caster and two single-strand slab casters (A-Line and B-Line), feature improved casting process stability after the installation of Danieli HY-POWER® electrohydraulic stopper actuators to regulate the steel flow, eddy-current double-coil sensor for a precise measurement of the mould level, and the Q-Level+ automation package for fine control of the entire system. U. S. Steel has reconfirmed its trust in Danieli by the decision to convert the C-Line caster at the Gary Works to the same flow technology.

Danieli

CHINA

Yunnan Qujing Chenggang invests in new high-speed bar mill

Yunnan Qujing Chenggang Steel Products has placed an order with Danieli for a new, 1.2 million t/year high-speed bar mill.

For the new mill, Danieli will install four SHS housingless stands followed by two six-pass wirerod blocks and, for large product sizes, two additional SHS stands. The mill will produce 8 to 40 mm diameter rebar and round bar, in grades HRBF 400E - 500E at rates of up to 200 t/h, starting with 165 mm billets weighing 2,500 kg.

Rebars from 8 to 22 mm will be rolled via an advanced multi-strand slit-rolling system on two strands at finishing speeds of up to 45 m/s. The plant will also feature an on-line water-cooling system, double high-speed twin channel system and a 120 m x 14 m cooling bed.

Danieli

Tangshan Reafon and Hegang Laoting order sublance systems for BOF shops

Danieli Corus has signed two contracts for a total of four sublance systems to be installed in China.

Tangshan Reafon Iron & Steel has contracted Danieli Corus to implement a sublance-based BOF process control system including a process model for one of the 210 t converters at the Tangshan, Hebei plant. Hegang Laoting has ordered three sublance systems complete with a process model and a slag control system for the 120 t converters of BOF shop No. 2 at their plant in the Laoting Economic Development Area in the Hebei Province. This order follows the supply of three systems for Hegang Laoting's BOF shop No. 1 in 2018 and 2019.

Danieli Corus

CHINA

Fives launches new strip processing line concept

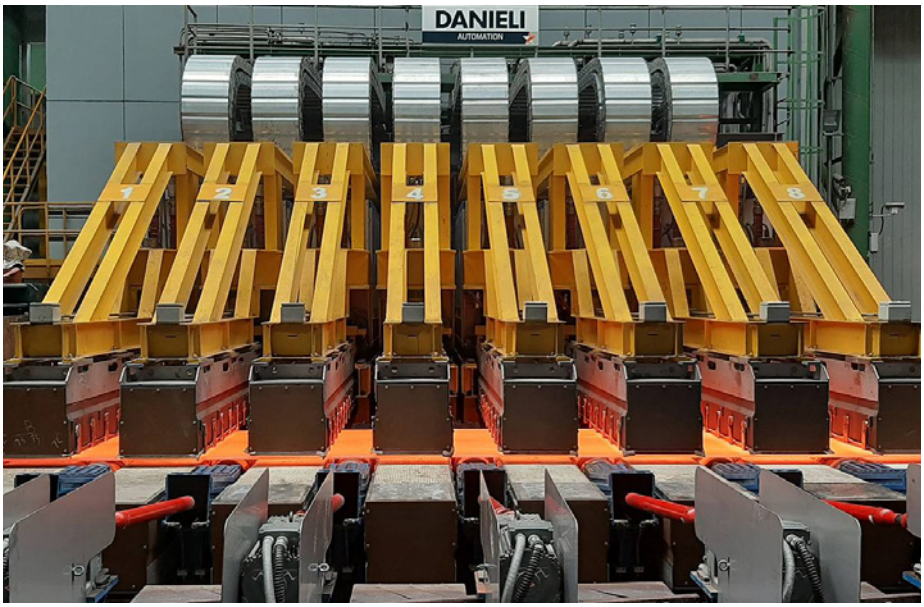
Fives introduced its new NeoKoil® SmartLine processing line solution at the China International Import Expo (CIIE).

Utilizing its expertise as an international industrial engineering group, Fives developed the new technology to help steelmakers meet the increasing demand for high value-added steel grades. This fully automatic strip processing line is based on predictive modelling to enable the best quality yield and optimal productivity.

"NeoKoil® SmartLine uses predictive metallurgical models combining physical laws and artificial intelligence to automatically achieve best quality and productivity results. Predictive metallurgical models are a key feature of the line. They are developed by Fives experts taking into account the entire processing history of the product. The models consider the effects of upstream slab production, annealing, cooling, galvanizing, and the skin-pass reduction process. The NeoKoil® SmartLine enables a shift from predefined setpoint management for each steel grade to automatically achieving optimal setpoints for the entire process and the desired steel grade properties.

Fives

Commissioning of new thin-slab casting and rolling plant underway at Shougang Jingtang



Commissioning of the new thin-slab casting and rolling plant is in progress at Shougang Jingtang (Picture: Danieli)

Shougang Jingtang, located in the Caofeidian Industrial Area, Tangshan city in the Hebei province, is seeing the commissioning of the first Danieli Universal Endless (DUE®) plant.

DUE® is a new concept of combining thin-slab casting and rolling within a single production line. The DUE® plant at Shougang Jingtang has already achieved the important milestone of producing the first coil in full endless mode: in the dimensions 3.0 mm x 1,250 mm, in medium-carbon grade, and after rolling just 45,000 t of hot-rolled coil since commencement of the hot tests. The single-strand thin-slab caster has been regularly producing slabs reduced from 130 mm to 110 mm, using Danieli's dynamic soft reduction technology. Coil-to-coil rolling has already become a consolidated production practice as has semi-endless rolling.

In addition, the company has had its hot rolling line 2250, in operation since 2008, refurbished by Danieli Service. The project included, among others, milling of the lower lateral surfaces of the F1 and F2 housing stands, 3D laser inspection and laser cladding, refinishing of a total of eight pin holes on stands F1, F2, F3, and F4, applying a special high-speed flat polishing process to address housing roughness.

Danieli

Nanjing Iron & Steel to upgrade Steckel mill

Nanjing Iron and Steel Co. (NISCO) has contracted Danieli to upgrade its 3500 mm Steckel mill with hydraulic automatic gauge controllers.

HAGC (hydraulic automatic gauge controllers) are critical components in flat rolling mills for the achievement of rolled product thickness within tight target tolerances. The project will be handled by Danieli Service, which provides steelmakers with consultancy services and full customer support through equipment and process upgrades. The equipment for Nanjing will be designed and manufactured in the Danieli manufacturing centres.

Danieli

Shandong Iron & Steel grants final acceptance for ultra-wide medium-slab caster

SMS group has received the FAC for the continuous caster with Industrie 4.0 technology supplied to Shandong Iron & Steel.

First slab produced on the new casting machine at Shandong Rizhao (Picture: SMS group)

The single-strand caster is designed for a production of 1.5 million t/year of steel slabs with widths of up to 3,250 mm and a thickness of 150 mm in structural, micro and low-alloy steel grades. Peritectic grades make up more than 45% of the overall production output. The slabs are hot charged into the Steckel mill which rolls them down to sheet and hot strip.

Shandong Iron & Steel has ordered the casting machine complete with latest quality-enhancing digitalization solutions. The digital HD LASr (High Definition Laser Aligning System remote) alignment assistant, developed by SMS group, guarantees that the moulds and segments are perfectly aligned. The mould features HD moldFO copper plates which are equipped with fibre optics for signal transmission. More than 500 measuring points are arranged over the complete mould surface. Based on the steel grades to be processed, the X-Pact® TechAssist system automatically selects the optimal technological parameter settings for the metallurgical process.

SMS group supplied all the X-Pact® electrical and automation systems for the continuous caster, the technological control systems and the technological process model.

SMS group

CHINA

Xiangtan places order for cokemaking technology

Paul Wurth is going to supply technology for the new coke making plant built at Xiangtan Iron & Steel.

Paul Wurth will supply engineering and SOPRECO® single oven pressure control systems for two top-charging coke oven batteries, which will be part of Xiangtan Iron & Steel's new coke making plant. Each battery counts 50 coke ovens with a height of 7.3 m, all of which will be equipped with Paul Wurth coke oven pressure and emission control. Coke production is scheduled to start in battery No. 1 at the end of 2020.

Paul Wurth

INDIA

Dalmia-OCL builds integrated snorkel manufacturing line

Dalmia-OCL – the refractories business of Dalmia Bharat – has built an integrated snorkel manufacturing line at Rajgangpur, Odisha.

Snorkels are a critical product used in RH degassers for clean steel production. The new line will allow Indian steel producers to source high-quality snorkels manufactured in India, eliminating the need to import.

With an annual capacity to manufacture 240 sets, the new snorkel manufacturing line features high-accuracy automated equipment like zero-tolerance grinding machines and high-temperature dryers to produce snorkels that match global standards. Dalmia-OCL's onsite R&D centre will also help accelerate further innovations in refractory technology for clean steel production.

Dalmia Bharat

ArcelorMittal and Nippon Steel complete acquisition of Essar Steel

Following the acquisition of Essar Steel India Limited, ArcelorMittal has established a joint venture with Nippon Steel, called ArcelorMittal Nippon Steel India Limited (AM/NS India).

Of the joint venture, which owns and operates Essar Steel India, ArcelorMittal holds 60% and Nippon Steel the balance. Aditya Mittal, president and CFO of ArcelorMittal, has been appointed chairman, and Dilip Oommen CEO of AM/NS India.

AM/NS India is an integrated flat steel producer, and the largest steel company in western India. Its current level of crude steel production is approximately 7.5 million t/year. It also has iron ore pellet facilities in the east of India, with current annual capacity of 14 million t/year. AM/NS India plans to increase finished steel shipments to 8.5 million t over the medium-term. This will be achieved by initially completing ongoing capital expenditure projects and then through the commissioning of additional assets, while simultaneously improving product quality and grades to realise better margins. A long-term aspiration is to increase finished steel shipments to between 12 and 15 million t through the addition of new iron and steelmaking assets.

ArcelorMittal

SMS India receives award for excellence in working conditions and work safety

Presentation of the award at the 8th VDMA Mechanical Engineering Summit (Picture: SMS group)

The 8th Mechanical Engineering Summit, held by the German Engineering Federation VDMA in September 2019 saw the presentation of the Manufacturing Excellence Award for Working Conditions and Work Safety in the small and medium industries category to SMS group's manufacturing workshop in Bhubaneswar.

In a wide range of aspects – such as health and safety of employees, staff facilities, plant administration, environment,

and contributions in support of the welfare of neighboring communities – SMS India Pvt. Ltd. was recognized as the best in class of German manufacturing companies in India. The VDMA award honors the company's excellent order processing performance, in particular, the company's high dependability, straightforward communication channels, and excellent welding skills.

Operating with an integrated quality management system, the workshop produces high-grade equipment components to global quality and delivery reliability standards. With over 700 skilled staff, the workshop – in addition to the manufacturing of components – also performs extensive repair and refurbishment services for its customers, promoting the "Make in India" initiative established by the Indian government.

SMS group

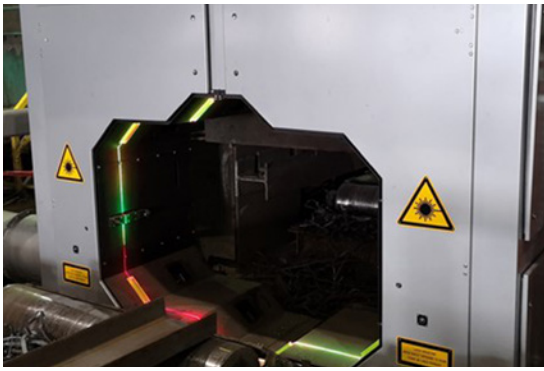
JAPAN

Yamato Steel orders laser measuring system

For its Kokyo section mill, Yamato Steel has ordered a PROgauge light-section system from TBK Automatisierung und Messtechnik GmbH, Graz, Austria, a company of SMS group.

The laser gauge will be designed to measure a wide range of medium and heavy sections, including H-beams and channels. The system will also include the SurfTec surface analysis function to detect on-line surface defects in the hot condition directly after the last mill stand. This allows inline detection of defects originating from the rolling process or from defective material, securely rules out the risk of processing defective material, and drastically reduces the frequency of manual inspections. The gauge combines two functions, shape and size measurement and surface analysis, within one unit. The high scanning rate and the great number of measuring points allows the surface to be represented in 3D. The gauge for Yamato Steel can be retracted from the mill line into a service position. Due the space restrictions, the device will be lifted vertically from the pass line. The new gauge is scheduled to start operation in December 2020.

SMS group



TBK supplied a similar gauge to Nucor Yamato Steel, USA, a joint venture company between Yamato Steel and Nucor (Picture: SMS group)

SOUTH KOREA

Daehan Sinpyeong completes bar mill revamp

South Korean Daehan Steel has issued SMS group the FAC for the new quenching and high-speed delivery lines supplied by SMS group two months ahead of the original schedule.

The main target of the bar mill modernization was to reduce the ferro-alloys content in the billets in order to reduce the

Water cooling boxes of the rebar quenching system (Picture: SMS group)

production costs. SMS group's supply scope included the replacement of the existing quenching line with a new one, installation of two dividing shears with associated pinch rolls and a bar braking system. Also part of the supply was the HSD® (high-speed delivery) line, a system that feeds the bars onto the cooling bed at high speed via rotating channels. SMS group also supplied an automation package for machine and process control. The modernization of the temperature control system and the bar mill outlet has achieved greater flexibility and cost reductions.

SMS group

VIETNAM

Pomina issues FAC for bar mill revamp

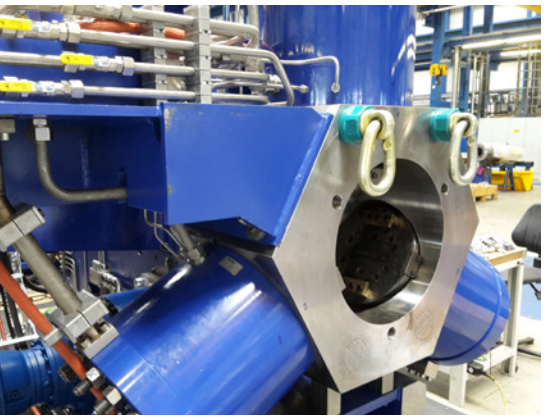
Less than six months from contract signature, Danieli Automation received the final acceptance certificate for the revamp of the bar rolling mill at Pomina 2 Works, Phu My Ba Ria Province, Vietnam.

Danieli Automation supplied the complete electrical and automation equipment for the bar mill upgrade, including new AC main drives of common regenerative-type DC Bus technology, auxiliary drives, motor control centres, low-voltage distribution and Level 1 automation for the reheating furnace and the bar mill.

Danieli

AUSTRIA

voestalpine Tubulars starts up new crimping press



The three-die crimping press recently commissioned at voestalpine Tubulars
(Picture: SMS group)

voestalpine Tubulars has successfully commissioned the new three-die crimping press supplied by SMS group.

The new press, which replaces a predecessor model supplied by SMS group back in 1998, will assure voestalpine Tubulars an increase in plant availability and higher yield. With the new press, the company will be able to further optimize crimping geometries and reduce set-up times. The entire crimping cycle has been reduced to just 17 s.

Crimping is a process that forms metal plate into a dish without reducing the thickness of the plate. The new press in operation at voestalpine Tubulars carries out the crimping centrically. During this process, no shear stress is being induced into the material and there is no buckle formation in between the crimping dies. This will result in a substantial improvement in the crimping shapes of the wide range of very different hollow geometries.

The new crimping press is part of the cross piercing elongating line on which voestalpine Tubulars manufactures high-grade tubular products for a broad application range.

SMS group

EUROPE

Tata Steel outlines proposals for transformation programme

Tata Steel has proposed a transformation programme for its European operations to ensure business can thrive despite severe market headwinds.

Tata Steel has highlighted plans to urgently improve its financial performance to make sure the European business becomes self-sustaining and cash positive, while enabling investment to safeguard its long-term future. The plans include a proposed new way of working to boost productivity and reduce bureaucracy as well as a focus on increasing sales of higher-value steel products and solutions.

The programme is focused on four areas to improve financial performance: Increasing sales of higher-value steels by improving product mix and customer focus; efficiency gains by optimising production processes, supported by the application of big data and advanced analytics; lowering employment costs, leading to an estimated reduction in employee numbers of up to 3,000 across Tata Steel Europe's operations, about two-thirds of which are expected to be office-based ('white collar') roles; and reduction of procurement costs through smarter sourcing and strengthening cooperation with companies within the Tata Steel group.

Tata Steel

FRANCE

Ascoval to revamp special steel caster

Danieli is going to revamp the four-strand caster, which it had supplied to Ascoval Saint Saulve in 2007.

Originally designed for the production of 180 to 325 mm rounds, the caster's product range will now be extended to include square billets of 150 to 240 mm and rectangular blooms of 300 mm x 365 mm. High-grade rail steel as well as engineering steel grades for industrial applications will be processed, last but not least enabled by the Danieli Rotelec final electromagnetic stirrers and the slow cooling system. Hot tests are scheduled for August 2020.

Danieli

GERMANY

Salzgitter enters field of commercial hydrogen production

Salzgitter Flachstahl GmbH (SZFG) has awarded Siemens Gas and Power an order to build a 2.2 MW Proton Exchange Membrane (PEM) electrolysis plant.

The PEM plant is due to commence operation in the 4th quarter of 2020 and cover SZFG's entire current demand for hydrogen. The necessary electrical power will be generated by seven wind turbines with a capacity of 30 MW. These will be erected by Avacon AG on the Salzgitter Group site and will likewise enter service from 2020.

Salzgitter AG Executive Board Chairman Professor Heinz Jörg Fuhrmann commented: "We are proud to be pioneers in the industrial application of hydrogen in the steel industry. As our SALCOS project has demonstrated, we are technologically in a position to achieve significant reductions in CO_2 with the aid of hydrogen. The Salzgitter wind hydrogen project is an important building block on the way towards climate-friendly steel production. It is now the turn of politicians to put in place the right conditions to support the transformation into a low-CO_2 industry."

Hydrogen has long played a role in steelmaking, particularly in enhancing the quality of annealing processes. The gas is currently supplied by Linde AG, and this company will in future continue to safeguard Salzgitter's own production. A containerized plant will be erected in Salzgitter which at full capacity will produce 400 Nm^3 of hydrogen. PEM technology is ideally suited to exploiting the volatile generation of wind and solar power. The highly dynamic mode of operation allows the plants to respond to demands resulting from the rapidly fluctuating power supply.

Salzgitter AG, Siemens

ITALY

Acciaierie Venete installs bar finishing equipment

Acciaierie Venete has commissioned the Danieli Drawer 550 finishing line for SBQ bars.

The project team at Acciaierie Venete (Picture: Danieli)

The new Danieli finishing line is designed for the production of 18 to 82.5 mm diameter rounds and squares from 30 to 60 mm. Covered by Danieli patents, the Drawer technology allows the production of ready-to-use, hot-rolled bars with tight dimensional tolerances of 1/8 DIN. Round bars can be produced by normalized rolling and thermomechanical rolling. The finishing line consists of four rolling components: units Nos. 1 and 2 are equipped with two and units Nos. 3 and 4 with four rolling rings each.

Danieli has implemented free-size rolling technology, i.e. a family of finished product diameters can be produced from one entry feedstock section with one set of Drawer rolling units. Rolled stock dimensions and surface qualities are monitored by Danieli Automation Hi-Profile gauges installed at the Drawer entry and exit sides. The Q-Shape automation package controls the operating parameters in a closed loop, ensuring that the finished product dimensions are within the requested tolerance.

Danieli

RUSSIA
EVRAZ upgrades hot blast stove plant at ZSMK

EVRAZ ZSMK and Paul Wurth have successfully completed the first phase of a stepwise technical upgrade of the hot blast stoves plant at ZSMK's No. 2 blast furnace in Novokuznetsk, West Siberia.

In 2014, Paul Wurth had won a tender for the engineering of a complete new hot blast generation plant in preparation of this project. ZSMK's experts decided in favour of hot blast stoves with internal combustion and ceramic burner of Paul Wurth design and the proposed three-stove operation concept as the most appropriate solution for an existing plant in operation.

In 2017, Paul Wurth won the tendering process for the supply of technological key components such as the ceramic burners, checker support systems, ignition burners, steel and fabric compensators, insulation bricks, shaped brick rings, material against stress corrosion cracking and silica bricks for the stove domes. According to the concept, the new hot blast stoves were built and commissioned one by one while the blast furnace remained in operation. In May 2019, the new stove was ready for heating up. It was taken on blast on 20 June 2019.

The next hot blast stove to be replaced is No. 6. The former installation has already been demolished. The new stove is scheduled for commissioning in July 2020. This will be followed by works on stove No. 5 as the final phase. The overall project is scheduled to completed by May 2021.

Paul Wurth

NLMK completes overhaul of basic oxygen furnace

NLMK Lipetsk has relaunched its basic oxygen furnace No. 2, a steelmaking facility with a capacity of over 3 million t/year, following an extensive overhaul.

The replacement of basic oxygen furnace No. 2 is the first stage in a large-scale overhaul of NLMK Lipetsk steelmaking operations. The next stage is scheduled to begin in May 2020, and will cover the overhaul of similar-capacity BOF No. 3. The steelmaking capacity upgrades will enable a 15% increase in the productivity of the shop to 10 million t/year of steel.

The launch of a new dust and gas collection system in line with Best Available Techniques (BATs) was tied in with the relaunch of the BOF.More efficient gas treatment equipment will capture 99.9% of dust emissions, which is in line with best global practices. The project will also enable the use of BOF gas for energy generation at a new recovery cogeneration plant planned for construction at NLMK Lipetsk.

NLMK

Severstal Cherepovets places order for sublance systems

Converters in the Cherepovets BOF shop will be equipped with sublance technology (Picture: Danieli Corus)

Severstal has contracted Danieli Corus to design and supply three sublance systems for three 350 t converters at the Cherepovets BOF shop.

The sublance-based BOF process control to b e provided by Danieli Corus will contribute to Severstal's objective of achieving lower steel production costs while maintaining efficiency and quality. Sublance technology, in combination with a state-of-the-art process model, enables shorter tap-to-tap times, higher hit rates and reduced consumption of oxygen, energy and flux materials, while improving operating conditions.

Danieli Corus

SPAIN

Acerinox Europa enhances AOD performance by installation of torque retainer

Acerinox Europa, Los Barrios, Cádiz, has successfully commissioned a torque retainer installed by SMS group at its 120 t AOD converter No. 2.

Since installation of the compact electrohydraulic torque retainer designed by SMS group, uncontrolled vibrations in the gear unit and the converter vessel have been significantly reduced. Likewise have the destructive forces acting on the bearings and the foundation when operating the AOD converter. According to the Acerinox, which issued the FAC shortly after the commissioning, the new equipment reduces maintenance and improves the operational reliability of the AOD converter.

The plant shutdown time for the equipment installation was very short thanks to the new installation concept developed by SMS group especially for Acerinox Europa.

SMS group

ArcelorMittal Asturias to upgrade reheating furnace at the hot strip mill

SMS group will supply a new combustion system for the existing walking beam furnaces 2N, 3N and 4N in the Aviles hot strip mill of ArcelorMittal Asturias.

The supply will consist of replacing the existing burners with the SMS EcoFlamePLUS dual fuel burners in the zones that will be upgraded and converted to basic oxygen furnace (BOF) gas utilization. 22 burners will be replaced on each furnace. This solution will guarantee more efficient combustion and an optimal flame mix, resulting in a reduction of NO_x emissions. The new technology will enable ArcelorMittal to drastically reduce NO_x emissions to lower than 150 mg/Nm³ and decrease CO_2 emissions.

The new burners can be fed either with a mix of BOF gas and natural gas or with BOF gas only. Thus, it is possible to use the gas from the upstream processes, making the works of ArcelorMittal more sustainable and environmentally friendly. Switching between the two gases will be performed automatically.

SMS group

Global Steel Wire to modernize six-strand billet caster

Global Steel Wire S.A. (Celsa Group), based in Santander, has placed the order for the upgrade of their continuous billet casting machine with SMS Concast, a company of SMS group.

Steel production at Global Steel Wire S.A. (GSW) is focused on wire rod in special steel grades for the automotive and special engineering industries. Currently, the existing caster processes roughly 900,000 t/year of steel into 180 mm square sections. The aims of the revamp are to increase the production flexibility by adding 200 to 240 mm square sections and to achieve higher casting speeds.

The order includes the installation of CONDRIVE mould oscillation drive systems on all strands. The modulated wave stirring feature will make for low energy consumption of the stirrers. The start-up of the upgraded casting machine is scheduled for early 2021.

SMS group

SWITZERLAND

Steel industry in the focus of the World Economic Forum 2020

Solutions for "green steel" can help the steel industry to move forward

Burkhard Dahmen, Chairman of the Managing Board (CEO) of SMS group gave an interview to the US tv station CBS News in the run-up to the World Economic Forum in Davos in January. CBS presenter Andrew Wilson asked questions "about the seemingly endless potential for one of the most important basic materials in our global civilization" and how high-performance metal-making enables the world's biggest innovations. Burkhard Dahmen explained the contribution to the modern steel production processes and plant solutions his company is offering. The possibilities of 3D printing materials and technologies and the innovative, efficient high-bay storage system Boxbay are only a few examples of the company's broad scope. (The QR contains a link to the eight-minutes interview on cbsnews.com).

SMS group

The interview is available on the website of CBS news

Contribution to the European Commission's Green Deal

ArcelorMittal Europe sets target to cut carbon emissions by 30% by 2030

In December, ArcelorMittal Europe announced a CO_2 roadmap to reduce emissions by 30% by 2030. The target, for ArcelorMittal Europe – Flat Products, is in line with an ambition announced in May 2019, to be carbon neutral in Europe by 2050.

Europe, with around 78,000 employees, a presence in 17 European countries and around 400 plants, is the continent in which ArcelorMittal has the strongest representation. The main steps on the road to climate neutrality include the development of sustainable products and, at the same time, the change in production processes.

The roadmap of ArcelorMittal Europe to achieve the 30% target is based on three distinct pathways that have the potential to deliver a significant reduction in carbon emissions, including:

- **clean power steelmaking**, using clean power as the energy source for hydrogen-based steelmaking, and longer term for direct electrolysis steelmaking;
- **circular carbon steelmaking**, which uses circular carbon energy sources, such as waste biomass, to displace fossil fuels in steelmaking, thereby enabling low-emissions steelmaking;
- **fossil fuel carbon capture and storage**, where the current method of steel production is maintained but the carbon is then captured and stored or re-used rather than emitted into the atmosphere.

Key to the success of the roadmap, and ArcelorMittal Europe's ambition to be carbon neutral by 2050, will be supportive policy to ensure a global level playing field and so ArcelorMittal supports the European Commission's Green Deal, and believes the right market mechanisms are a critical part of enabling the deployment of low-emissions steelmaking. This includes a carbon border adjustment complementary to the existing Emission Trading Scheme (ETS) and the Just Transition Fund, to invest in research, innovation and green technology.

Initiatives and technologies underway or to be implemented at ArcelorMittal Europe – Flat Products' different sites include:

- Carbalyst – capture waste gases from the blast furnace and biologically convert it into bio-ethanol. The € 120 million launch project at ArcelorMittal Ghent, Belgium is expected to be completed in 2020.
- IGAR – captures waste CO_2 from the blast furnace and converts it into a synthetic gas that can be reinjected into the

The existing Midrex plant at the Hamburg production site is the one with the lowest CO_2-emissions for high quality iron production in Europe (Picture: ArcelorMittal)

blast furnace in place of fossil fuels to reduce iron ore. An industrial pilot of this technology is being developed at ArcelorMittal Dunkirk in France.

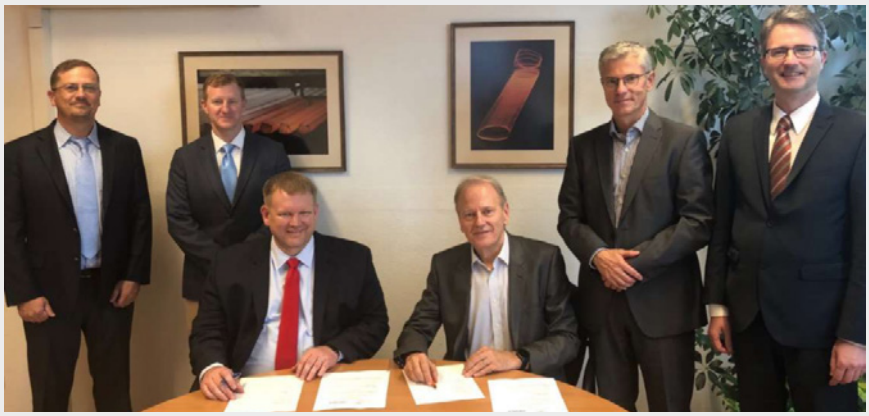
- Torero – €40m investment to convert waste wood into bio-coal to displace the fossil fuel coal currently injected into the blast furnace. Our first large scale demonstration plant in ArcelorMittal Ghent, Belgium is expected to be in operation by the end of 2020.
- Reducing iron ore with hydrogen – €65m investment at Hamburg, Germany site to increase the use of hydrogen for the direct reduction of iron ore.
- Carbon capture and storage – integrating breakthrough technologies to bring down the costs of capturing, purifying and liquifying CO_2 from waste gases. Construction of a carbon capture and storage pilot project, 3D, will begin at ArcelorMittal Dunkirk, France in 2020 and will be able to capture 0.5 metric tons of CO_2 an hour from steelmaking gases by 2021.

Geert Van Poelvoorde, CEO ArcelorMittal Europe – Flat Products, says: "We are committed to the decarbonization of the

ArcelorMittal commissions Midrex to design a demonstration plant for DRI production with hydrogen in Hamburg, Germany

ArcelorMittal has commissioned technology provider Midrex Technologies to design a demonstration plant at its Hamburg site to produce steel with hydrogen. Both companies have now signed a Framework Collaboration Agreement (FCA) to cooperate on several projects, ranging from research and development to the implementation of new technologies. The FCA will be governed by a number of Project Development Agreements, incorporating the expertise of Midrex and ArcelorMittal. The first Project Development Agreement is to demonstrate in Hamburg the large-scale production and use of Direct Reduced Iron (DRI) made with 100% hydrogen as the reductant.

In the coming years, the demonstration plant will produce about 100,000 tons of direct reduced iron per year – initially with grey hydrogen sourced from natural gas. Conversion to green hydrogen from renewable energy sources will take place once available in sufficient quantities and at an economical cost. Energy for hydrogen production could come from wind farms off the coast of Northern Germany. The plant will be the world's first direct reduction plant on an industrial scale, powered by hydrogen.



Signing the contract to design a demonstration plant for ironmaking with hydrogen (from left): Vincent Chevrier, Todd Astoria and KC Woody from Midrex with Dominique Vacher, Dr Uwe Braun and Matthias Schad from ArcelorMittal (Picture: ArcelorMittal)

"We are working with a world class provider, Midrex Technologies, to learn how you can produce virgin iron for steelmaking at a large scale by only using hydrogen. This project combined with our ongoing projects on the use of non-fossil carbon and on carbon capture and use is key to become carbon neutral in Europe in 2050. Large scale demonstrations are critical to show our ambition. However it will depend on the political conditions, how fast transformation will take place", comments Carl de Maré, Vice President at ArcelorMittal and responsible for technology strategy.

ArcelorMittal Hamburg already produces steel using DRI technology. During the process, iron oxide pellets are reduced to metallic iron, the raw material for high quality steel, by extracting oxygen using natural gas. "Our site is the most energy-efficient production plant at ArcelorMittal", says Dr Uwe Braun, CEO at ArcelorMittal Hamburg, adding that the existing Midrex plant in Hamburg is also the plant with the lowest CO_2-emissions for high quality steel production in Europe.

"With the new, hydrogen-based DRI plant we are now planning, we will raise steel production to a completely new level, as part of our Europe-wide ambition to be carbon neutral by 2050", Dr Braun concludes.

"This commercial scale project will show the path for hydrogen based iron and steel making", commented Stephen C. Montague, President & CEO of Midrex Technologies Inc. "We are excited to work with ArcelorMittal as pioneers for using renewable energy in our industry."

Midrex Technologies, Inc., Charlotte, NC/USA

Our roadmap and the emissions reduction target of 30% by 2030 for Europe is a big step in the right direction. It's not a one-size-fits-all model, as different parts of our business are at varying starting points.

Geert Van Poelvoorde, CEO ArcelorMittal Europe – Flat Products

steel industry, in line with the objectives of the Paris Agreement and the European Union's commitment to net-zero by 2050 as announced in the Green Deal in December. Our roadmap and the emissions reduction target of 30% by 2030 for Europe is a big step in the right direction. It's not a one-size-fits-all model, as different parts of our business are at varying starting points. For some sites, certain technologies will work while others will be suited to another route. We've spent the last few years testing a range of technologies and now is the time to scale up and put them into action, with the support of the EU and member states, to ensure we are able to fully decarbonise."

ArcelorMittal welcomes the European Commission's Green Deal

Following the publication of the European Commission's Green Deal, Geert Van Poelvoorde, CEO ArcelorMittal Europe – Flat Products, says:

"Europe's commitment to reduce its carbon emissions to be net-zero should be applauded and we commend the leadership of Mrs von der Leyen and her team. However, the Green Deal will only work if there is full-scale transformation and support for industries."

"The climate challenge is unprecedented, and bold action is therefore needed. Achieving our ambition of being carbon neutral by 2050 is a major challenge, but with the right political framework – allowing European steelmakers to remain competitive while the steel industry moves to carbon-neutral steelmaking – we're convinced it's achievable. The proposal for a carbon border adjustment, which effectively puts a carbon price on imports, recognizes that every country needs to play its part in reducing global CO_2 emissions. By preventing steel production moving to countries where carbon emissions legislation is less strict, and where carbon emissions are therefore higher, means we put a stop to carbon leakage. This is exactly the type of action that is needed."

While support for a carbon border adjustment has been growing in recent months, ArcelorMittal was one of the first companies to support a proposed carbon border adjustment and backs the European Commission's proposals for a € 35 billion 'just transition' fund, to invest in research, innovation and green technology.

ArcelorMittal Europe

News brief

GERMANY

SMS group to build new headquarters complex

SMS group is building a new headquarters complex next to the existing buildings at its Mönchengladbach site. The new campus is scheduled to be ready to be moved in in 2023.

Model of the new SMS Campus planned to be built in Mönchengladbach (Picture: SMS group)

The decision to build the new facilities stems from the longstanding wish to unite employees from many different business units under one roof while offering them state-of-the-art workplaces. The SMS Campus will bring together employees who, until recently, had been spread across five locations in the immediate area. By merging these locations, SMS group is promoting even closer cooperation along the entire value chain. The Technology, Service and Digitalization Campus will enable agile working within a 5G infrastructure and feature generously spaced social and communication areas. The existing properties in Mönchengladbach will be modernized with a view to optimally integrating with the new facilities. Alongside office equipment and traffic concepts, cost aspects were thoroughly analyzed and compared, resulting in the SMS Campus in Mönchengladbach to be the most efficient solution. In particular, the costs of the newly constructed building complex will be offset by avoiding further rental costs and necessary renovations at the existing premises in Düsseldorf, and through the sale of this company property.

SMS group

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DVS MEDIA

Steelmaking

SSAB to be first to market with fossil-free steel already in 2026

The plan for transitioning to iron-ore based fossil-free steel production was presented to more than 400 customers and key players in the industry, in conjunction with SSAB's Swedish Steel Prize seminars in November 2019 in Stockholm, Sweden

Recently it was announced that the HYBRIT initiative, where SSAB is one of the owners, will step up work and that global steel company SSAB will be able to deliver fossil-free steel to the market already in 2026. In line with SSAB's global ambitions, the company anticipates that its US operations, which utilize scrap-based electric arc furnace (EAF) technology, will be powered completely by renewable energy by 2022 in its Iowa operations. It will also be able to offer fossil-free steel products starting in 2026, utilizing sponge iron developed through the HYBRIT initiative in Sweden.

That SSAB already at this stage seeks to engage customers in its plans to switch over to a completely new steelmaking technology is a natural step in the company's ambition to step up the pace in transitioning to being fossil free.

"It will take time for a completely new market for fossil-free products to emerge and so we need to start now. Together with our customers, we will work to find successful business models to launch fossil-free products on the market already in 2026," said Martin Lindqvist. "Fossil-free steel will also help other sectors such as automotive, heavy transport and construction to become fossil free. Together, we will be able to offer end-users a completely fossil free value chain, from the mine to the end product."

In 2016, SSAB, together with LKAB and Vattenfall, launched the HYBRIT initiative with the goal to replace coal and coke, which are used as reduction agents in the steelmaking process, with fossil-free hydrogen gas. Interest in fossil-free steel has since grown rapidly.

In September 2019, Martin Lindqvist, representing the only steel company at the summit, was invited to the UN Climate Action Summit in New York, to talk about something which has hitherto been considered impossible, the potential for net-zero emissions in the steel industry. "We want to show that transition in the steel industry is not only possible, but truly necessary. When we show the way, I think others will follow," said Martin Lindqvist.

The steel industry accounts for around 7% of global carbon dioxide emissions. In Sweden steelmaking accounts for 10% and in Finland for 7%. The technology to use hydrogen gas instead of coking coal to reduce iron ore is known, but has never been successfuly tested on an industrial scale. HYBRIT is now building a pilot plant

Martin Lindqvist, SSAB's President and CEO, presented the plan to more than 400 customers and key players in the industry in November in Stockholm. (Picture: SSAB)

for sponge iron (DRI) at SSAB's site in Luleå. The plant will be up and running in summer 2020.

"Technological development is already in full swing. By challenging technology that has remained essentially unchanged for almost a thousand years, we will in principle eliminate all fossil carbon dioxide emissions. To date, CO_2 has been an unavoidable by-product in making steel from iron ore. With HYBRIT technology, the only emission will be water," says Martin Pei, CTO at SSAB and chairman of the Board at HYBRIT Development.

SSAB, LKAB and Vattenfall, the owners behind the HYBRIT initiative, have decided on investments totaling around SEK 1.7 billion and the Swedish Energy Agency has granted government support totaling SEK 599 million.

Further, SSAB has decided to replace the two blast furnaces in Oxelösund with an electric arc furnace already in 2025. This will eliminate most of the carbon dioxide emissions at SSAB Oxelösund. The switch to an electric arc furnace is a necessary step in order to be able to utilize the sponge iron from the HYBRIT demonstration plant, which will start operating at the same time.

> SSAB will offer the first fossil-free steel products on the market already in 2026. We seek to initiate partnerships with our customers around common goals so that they can be the first in the world to include fossil-free steel in their own products
>
> *Martin Lindqvist, SSAB's President and CEO*

"We intend to gradually convert the entire production chain right up to finished steel across SSAB's production system in Sweden, Finland and the US. The goal is for the entire company to be fossil-free by 2045 at the latest," said Martin Pei.

Replacing fossil fuels in other steelmaking processes than ironmaking

SSAB has started another study in Finland for fossil-free steelmaking. In partnership with Gasum, Neste and St1, SSAB is initiating an Energy-4HYBRIT prefeasibility study supported by Business Finland to investigate the use of fossil-free energy sources, primarily biomaterial side-streams, to replace fossil fuels in certain steelmaking processes, for example rolling processes. The Raahe mill will act as SSAB's pilot.

"The joint Energy4HYBRIT project now being launched will focus on the remaining 10% of carbon dioxide emissions originating in numerous other steelmaking processes than ironmaking. One of the main aims in the prefeasibility study will be to explore the possibility to use fuels other than fossil fuels in these processes. Regarding biofuels, the project will study the possibilities of collecting, transporting and utilizing felling and other biowaste and sidestream products from the Baltic Sea region," says Harri Leppänen, Director, Environment and Safety at SSAB.

SSAB Raahe will act as SSAB's pilot works. The University of Oulu and VTT will study and model all the energy flows at the works. The energy companies involved in the prefeasibility study are looking into the use and availability of alternative energy sources. The study will be finished before June 2020.

SSAB

Interim target 2030: 30 percent reduction of emissions

thyssenkrupp starts tests to utilize hydrogen in a blast furnace

thyssenkrupp Steel has celebrated a world first. On November 11, 2019 the Germany-based steel producer has launched a series of tests to utilize hydrogen in a working blast furnace. They are the first tests of their kind and are aimed at reducing significantly the CO_2 emissions arising during steelmaking. The start of the test phase marks a milestone in the transformation towards climate-neutral steel production.

The tests now started are an important part of thyssenkrupp's climate strategy to become climate-neutral by 2050. By 2030 emissions from the company's own production and processes (scope 1 emissions) as well as emissions from the purchase of energy (scope 2) are to be reduced by 30 percent. "We've set ourselves a clear goal with our climate strategy," said Dr. Klaus Keysberg, member of the Executive Board of thyssenkrupp AG and responsible for the group's materials businesses. "Steel production will play an important part in reaching our climate targets because the potential for reducing emissions is huge. That's why we're working flat out to drive the transition to hydrogen technology."

Water vapour instead of CO_2

In the classic blast furnace process around 300 kilograms of coke and 200 kilograms of pulverized coal are needed to produce a ton of hot metal. Pulverized coal is injected as an additional reducing agent into the blast furnace shaft through so-called tuyeres. At the start of the tests hydrogen was injected through one of these tuyeres into blast furnace No. 9 in Duisburg, Germany. It marked the start of a series of tests in which thyssenkrupp Steel plans to gradually extend the use of hydrogen to all 28 tuyeres at blast furnace No. 9 and then, from 2022, also to the other three blast furnaces onsite. The advantage is that whereas injecting coal produces CO_2 emissions, using hydrogen generates water vapor. CO_2 savings of up to 20 percent are therefore already possible at this point in the production process.

"Today is a groundbreaking day for the steel industry," said Premal Desai, Chairman of thyssenkrupp Steel Europe. "We are doing pioneering work here. The use of hydrogen is the key lever for climate-neutral steel production. Today's test is another step in the transformation of our production which will culminate in green steel. At the same time, we see what is possible when business and government work together towards a common goal. We are very grateful to the federal state of North Rhine-Westphalia (NRW) for supporting the project."

Gas line suppling hydrogen to the blast furnace (Picture: thyssenkrupp)

The project is being funded under the IN4climate.NRW initiative launched by the state government and is scientifically supported by the BFI research institute. The state government gave funding approval for the first test phase in April 2019. NRW economics and digital minister Prof. Dr. Andreas Pinkwart: "The project is an important step on the path to a greenhouse gas-neutral industry and a good example of how innovative key technologies can be developed in North Rhine-Westphalia. We need to keep driving the use of hydrogen in industry because it offers great opportunities, especially in steel production."

> The use of hydrogen is the key lever for climate-neutral steel production. Today's test is another step in the transformation of our production which will culminate in green steel
>
> *Premal Desai, Chairman of thyssenkrupp Steel Europe*

From lab to industrial scale

The start of the test phase also marks the project's transition to industrial scale. Preliminary investigations and simulations have been carried out during the recent months. The tests in a working blast furnace take the project to the next level. "We want to reduce emissions with hydrogen while continuing to produce hot metal of the same quality," explains Dr. Arnd Köfler, Chief Technical Officer at thyssenkrupp Steel Europe. "At the same time we are breaking new ground with the tests at the blast furnace No. 9. Now it is a question of continuously analyzing and evaluating the operation of the blast furnace. The results will help us to widen the use of hydrogen to all 28 tuyeres."

Hydrogen supply chain becomes more and more important

Hydrogen will be a key driver of thyssenkrupp Steel's climate strategy in the decades to come. Following the conversion of the blast furnaces, the company plans to build large-scale direct reduction plants, which will then be operating with hydrogen-containing gases, starting in the mid-2020s. The sponge iron they produce will initially be melted down in the existing blast furnaces but in the long term will be processed into crude steel in electric arc furnaces using renewable energies.

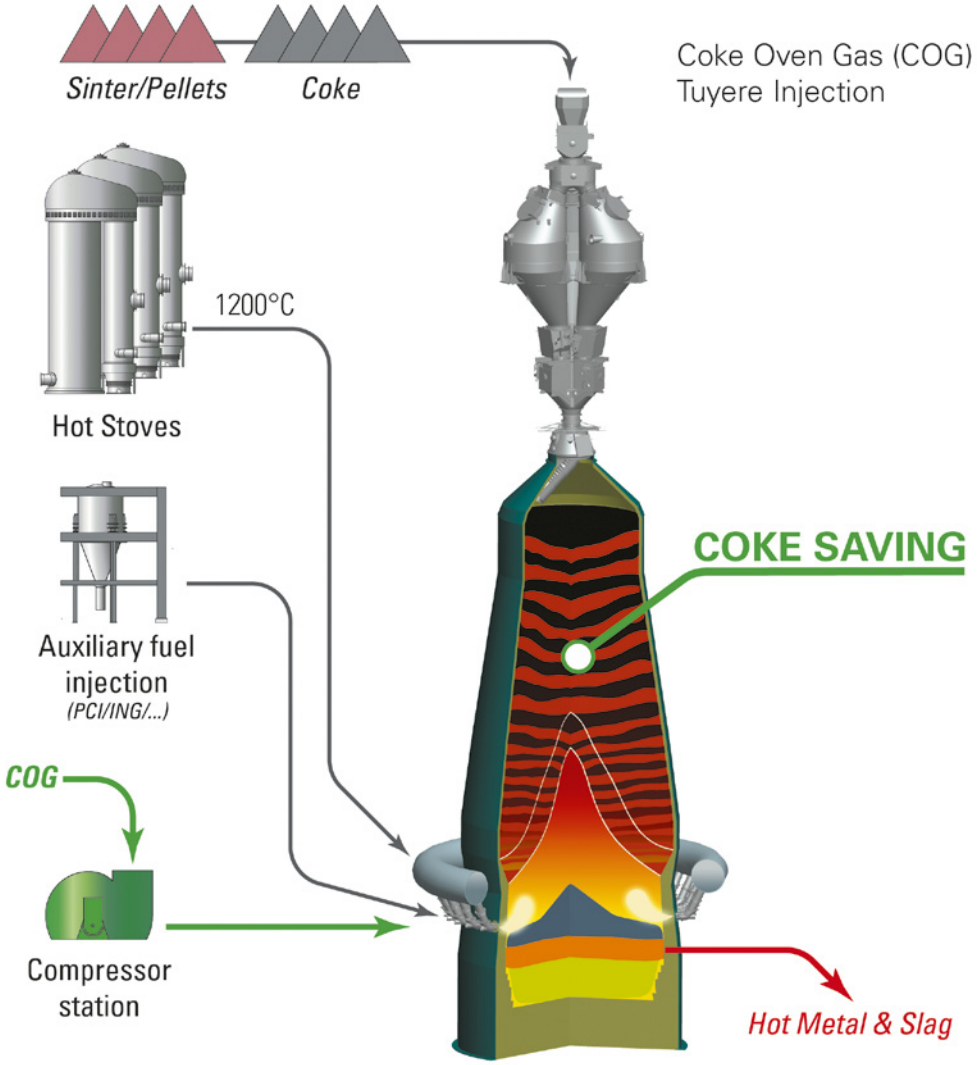
Air Liquide has joined the project for the injection tests. The gas company has gained expertise in the entire hydrogen value chain from production and storage to the development of end consumer uses. Gilles Le Van, CEO of Air Liquide Deutschland: "Hydrogen is the key to both the energy transition and industrial transformation. This special molecule can be both a raw material for the industry and a medium for energy storage and recovery. At Air Liquide, we are convinced there is hight potential for a global hydrogen economy – and we bring more than 60 years of experience and innovation in this field to our joint project work. Together, we are shaping Germany's hydrogen future and contributing to the achievement of climate goals."

thyssenkrupp Steel Europe

Ironmaking

Coke oven gas injection systems for blast furnaces

ROGESA Roheisengesellschaft Saar mbH, a joint subsidiary of AG der Dillinger Hüttenwerke und Saarstahl AG, has awarded Paul Wurth with the order to design and supply coke oven gas injection systems for the company's blast furnaces No. 4 and No. 5 located in Dillingen/Saar, Germany.



Coke oven gas (COG) will be injected at the tyeres thus helping to reduce coke consumption in the ironmaking process (Picture: Paul Wurth)

With this new technology, coke oven gas will become a metallurgical process gas instead of being used for producing energy at low efficiency level. In its new role, coke oven gas will partially replace both pulverized coal and metallurgical coke as reducing agents in the blast furnace process, thus contributing to reducing the carbon intensity in the blast furnace as well as the carbon footprint of the overall ironmaking operations. ROGESA, Dillinger and Saarstahl consider the application of this technology as a bold step toward the hydrogen based ironmaking of the future.

In preparation of the project, Paul Wurth accompanied the customer in research work and pilot plant trials. Now, the order is being executed on a turn-key basis and includes design and engineering for the two coke oven gas injection subplants, supply of technological key items like flow control and check valves, supply and erection of vessels, piping and supporting structure, automation of the plants and integration into the existing process technology and plant configuration.

As per the project schedule, coke oven gas injection shall start in summer 2020 at half of the number of hot blast tuyeres of blast furnace No. 5 with the aim to come to permanent injection at all tuyeres of both furnaces by the end of the same year.

Within Paul Wurth's strategy to come to a carbon neutral primary metallurgy, coke oven gas injection at tuyere level is a part of the company's portfolio of readily available solutions for stepwise CO_2 emission reduction for existing integrated steel plants

Paul Wurth Group, Luxembourg

Ironmaking

New BF lungs commence operations at Trinec Iron and Steel Works

The lighting ceremony of the burner on 28 November morning started the process of drying the new hot blast stove at blast furnace No. 6 of Trinec Iron and Steel Works, Czech Republic. The Kalugin-type hot blast stove has replaced an old recuperator that has reached the end of service life.

The new air heater has significantly better parameters than the old obsolete equipment. "Kalugin is smaller unit and has no combustion shaft. This means that the burner is located directly in the heater dome. The whole cycle is easier, flue gas and subsequently heated air flows in only one direction. This greatly reduces both thermal energy consumption and heat load of the heater dome and has lower heat losses", explains Radek Olszar, Director of Investment and Strategy at Trinec Iron and Steel Works. Its operation is thus more economical and environmentally friendly.

The investment of more than 260 million Czech koruna (approximately 10 million euro) started with the demolition of the original equipment a year ago, and the new facility was commissioned while the BF was under full operation. The new hot blast stove will be put into operation after drying the lining and connecting it to the blast furnace in February 2020 as the second in a row. The third one will be upgraded next, completing the renewal of the battery of hot blast stoves, leaving only three of the existing four heaters.

The hot blast stove, also known as the blast furnace lung, heats the air to 1,250°C, utilizing the heat generated by the blast furnace gas combustion. Every day, this type of hot blast stove heats up to 1,500,000 m³ of air to generate the hot blast. It is then transported by blowers to the tuyeres of the blast furnace.

The blast furnace No. 6 at Trinec Iron and Steel Works is operated by a staff of 43 employees working at the control room and in the field. The furnace was blown in for the first time in 1952, underwent overhauls in 1963, 1973, 1985 and finally in 1999. The current campaign is expected to end in 2021, with over 22 million tons of hot metal production.

The new Kalugin recuperators were supplied by the company of the same name based in Yekaterinburg, Russia. Kalugin supplies its technology to customers in Russia, China, India, Syria, Indonesia, Japan, Ukraine, Brazil, Turkey and Kazakhstan. However, Trinec Iron and Steel Works is the first site in the European Union where this recuperator was built.

The third new hot blast stove commenced operations in November 2019 (Picture: Trinec Iron and Steel Works)

Revamp of blast furnace No. 4

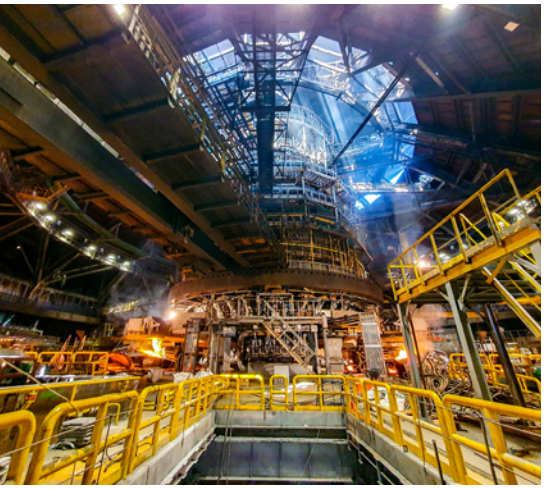
The other one of the two blast furnaces of Trinec Iron & Steel Works underwent extensive repairs in October last year. After a 14 years campaign, the BF was relined, including the complete replacement of the carbon blocks in the hearth. "The revamp will extend the service life of the blast furnace by at least another five years," sayd production director Česlav Marek. For repair of the two tap holes, alternative technology was used by pouring heat-resistant concrete.

Trinec Iron and Steel Works, Trinec, Czech Republic

Ironmaking

NLMK group launches upgraded blast furnace No. 6 in Lipetsk, Russia

NLMK and Paul Wurth accomplish major blast furnace reline successfully. The overhaul of blast furnace No. 6 has been one of NLMK Group's Strategy 2022 key projects.



On October 31st, short before midnight, the new blast furnace No. 6, designed and equipped by Paul Wurth, has been blown-in (Picture: Paul Wurth)

NLMK Lipetsk ironmaking operations

Blast Furnace No.6 was built in 1978, and is now the second most productive blast furnace at NLMK. After the revamp it is designed for nominal production of 3.4 million t/year. In addition to BF-6, NLMK Lipetsk operates four other blast furnaces: BF-3 (1.6 million t/year), BF-4 (2 million t/year), BF-5 (2.9 million t/year) and BF-7 (4.2 million t/year).

NLMK Group

Within the frame of NLMK Group's Strategy 2022, blast furnace No. 6 at NLMK's main site in Lipetsk, Russia, has been completely rebuilt during a furnace outage stretching from May until October 2019. On October 31st, short before midnight, the new blast furnace No. 6, designed and equipped by Paul Wurth, has been blown-in.

NLMK's order awarded to Paul Wurth foresaw engineering, supply of equipment and site supervision related to the complete rebuild of BF-6's central unit, i.e. the blast furnace proper and directly attached systems and equipment.

Under this contract, Paul Wurth had first to adapt the earlier delivered basic engineering to the final main technical solutions chosen together with the customer. Further on, the company was in charge of the overall engineering which has been executed in close collaboration with local design specialist NLMK Engineering.

Paul Wurth's scope of supply comprised the blast furnace shell, hearth lining with super-microporous carbon and ceramic cup, all other refractories, all cooling elements (copper and cast iron staves, copper cooling boxes, tuyeres and tuyere coolers), low energy tuyere stocks and a completely new bustle pipe. The original Bell Less Top®, Paul Wurth's first ever reference in the former Soviet Union and in operation since 1978, has been replaced completely by a new, state-of-the-art parallel-hopper type system (60 m³ hopper volume) including the pressure equalizing and bleeder valves. Furthermore, Paul Wurth supplied the cooling water pump house with the complete instrumentation, general electrical and control equipment.

The process control for the all-new furnace will now be supported by TMT's stockline recorders, SOMA® acoustic top gas temperature measurement and 3DTopScan® burden profile mapping system. Some dedicated mathematical models out of Paul Wurth's BFXpert® level-2 automation package complement the new process automation system. For the casthouse, four sets of TMT's fully hydraulic clay guns, taphole drills and radar level probes for torpedo ladles have been part of the order.

The previous blast furnace No. 6 has been taken out of operation in May 2019. A dedicated team of Paul Wurth experts was supporting the customer and other contractors during pre-shutdown activities, supervising erection and commissioning of the new plant units.

NLMK's new BF-6, with a hearth diameter of 12.0 m, an inner volume of 3,818 m³, 32 tuyeres and 4 tapholes, is designed for nominal production of 3.4 million tons of hot metal per year. It was part of the contract that the customer purchased from Paul Wurth not only engineering and equipment but also the process technology for operating the furnace. Important auxiliary plant units for the operation of the new BF-6 have been installed and commissioned even before the year's shutdown during the previous furnace's campaign already: Paul Wurth's top gas cleaning technology, top gas energy recovery system with turbine (TRT), the joint pulverized coal injection (PCI) plant for blast furnaces No. 6 and 7 as well as the upgradation of existing cold blast generation blowers. From now on, they are integral parts of another all-modern ironmaking facility at NLMK Lipetsk.

Paul Wurth Group, Luxembourg

From left to right, Giacomo Mareschi Danieli / Danieli CEO, Gianpietro Benedetti / Danieli Chairman, John Ferriola / Nucor Chairman and CEO, Leon Topalian / Nucor President and COO, Paolo Losso / Danieli Corporation President (Picture: Danieli)

Heavy plate

Nucor to build greenfield plate steel mill complex in Brandenburg, Kentucky, USA

Producing thermo-mechanical rolled plates, supported by advanced automation, it will become a new benchmark plant. Main production facilities of the new plate steel mill complex will comprise an electric arc furnace (EAF) melt shop, a single-strand caster for ultra-wide and thick slabs and a plate-/Steckel-mill.

Nucor Corporation, America's largest steel and steel products producer, has selected plant suppliers to provide main equipment for its new greenfield plate steel mill complex in Brandenburg, Kentucky, USA. Danieli will supply the new Electric Arc Furnace (EAF) melt shop and plate/Steckel mill, as well as an electrical and automation package provided by Danieli Automation.

Nucor will invest approximately $1.35 billion USD to build the mill, which will be capable of producing 1.2 million net (US) tons per year of steel plate products. The value of Danieli supply is approx. $330 million USD.

The selected location on the Ohio River will give Nucor logistical advantages in the heart of the largest steel plate consuming region in the United States. Nucor currently operates plate mills in North Carolina, Alabama and Texas.

"We are proud to be able to continue our long-time, successful relationship with Danieli." said Johnny Jacobs, vice president and general manager of Nucor Steel Brandenburg. "Our new plate mill will serve as a benchmark for our industry and will make Nucor the market leader right in the center of America's largest plate consuming region."

The EAF will be a full platform design with an eccentric bottom tapping system (EBT), equipped with all modern mechatronic devices to improve the performance and the safety of the EAF, such as: Q-Melt and Zero Man Turn Around.

Danieli will also supply secondary metallurgy equipment, including a twin station ladle metallurgical furnace (LMF) and a twin station vacuum tank degasser (VTD) equipped with mechanical pumps. Both units will be equipped with the latest automation and process models to ensure precise chemistry and temperature control, whilst minimizing transformation costs.

The plate/Steckel mill will be equipped with two stands: a roughing mill and a Steckel mill, where the roughing mill will also be designed for the rolling of 36" (915 mm) ingots. The complete design of the plate mill will be optimized for the production of thermo-mechanical rolled plates, production of API-grades, as well as high hardness wear resistant plates up to a rolled width of 160" (4,064 mm) and coils up to a rolled width of 125" (3,175 mm). Subsequent to the plate/Steckel mill will follow the latest EVO 5 hot leveler designed for two different types of cassettes and a plate finishing and shearing line for the handling and cutting of 250 ft (76.2 m) mother plates.

Final products will be plates and heavy plates in a thickness range of 3/16" up to 14" (4.76 to 356 mm) and coils from 3/16" up to 1" (4.76 to 25.4 mm). When operational, the new plate mill will capable of producing 97% of plate products demanded in the U.S. market. The first plate is expected to be rolled in 2022.

Danieli

Vertical-bending slab casting machine

Nucor Corporation has selected SMS group for the supply of a single-strand caster for ultra-wide and thick slabs. The caster will produce slabs of 8" to 12" (200 to 305 mm) thickness up to 124" (3,150 millimeter) width. Slab lengths vary from 104" to 600" (2,642 to 15,240 mm). To meet Nucor's challenging project objectives, several special technological features will be incorporated into the new vertical bending caster. These include robotic applications on the casting platform and an HD mold with fiber optics and electromagnetic stirring. In addition, a customized roller apron, a quenching unit and a secondary cutting line will also be incorporated. Various X-Pact® technological packages like Process Guidance, Solid Control, Tech Assist with Liquid Core Reduction® and Dynamic Soft Reduction®, integrated in the SMS electric and automation system will support the caster performance.

SMS group

Steelmaking

Thermochemical erosion of ladle well fillers during steel production

In 2016 the authors' findings on temperature distribution and oxygen partial pressures in the well block of steel ladles in an EAF steel plant in northern Spain were published [1]. Fuelled by these observations, further experiments were conducted to examine the thermophysical properties of ladle well fillers and intensively research their sintering behaviour and the consequential development of mechanical strength. To verify their conclusions and gain new information on the thermochemical interactions between ladle well fillers and steel, Purmetall and Forschungsgemeinschaft Feuerfest realized a follow up project together with Georgsmarienhütte, wherein live trials and laboratory experiments lead to new insights.

During steel production, ladle well fillers are exposed to a wide range of conditions, depending on the process route, the applied treatments and the chemical composition of the produced steel grade. Free opening ladle wells are essential for the efficient production of high-quality steel grades. To verify the theories resulting from their ongoing research efforts [1], Purmetall GmbH Co. KG conducted industrial trials with Georgsmarienhütte GmbH in the EAF steel plant in Georgsmarienhütte, Germany, to examine the behaviour and thermochemical erosion of an applied mass of ladle well filler in contact with liquid steel during routine production.

As a supplier for the automotive industry, Georgsmarienhütte steel works produce roughly three quarter million tons of steel rounds in its eponymous hometown. The steel mill is equipped with a 140 t DC EAF, two ladle furnaces, a purging stand, wire injector and a vacuum degassing facility. The finished, high quality steel grades are then shaped via a six-strand billet caster or ingot casting.

Industrial trials

At Georgsmarienhütte, steel ladles are equipped with two slide gate systems, one main operating well block, inner nozzle and slide gate and one backup system. The main slide gate is used during routine production at the continuous caster. Well block and casting channel are cleaned and ladle well filler is added to the casting channel. After the following treatment of the produced steel grade, the main slide gate system opens and the ladle well filler flows into the tundish, enabling a free opening of the steel ladle. Since the ladle well filler from the main slide gate system is hereby lost, only the backup system allows trials which examine the applied mass of ladle well filler after steel production. For these trials, the backup system that is not routinely opened during regular production was cleaned from both, ladle top and bottom before addition of ca. 50

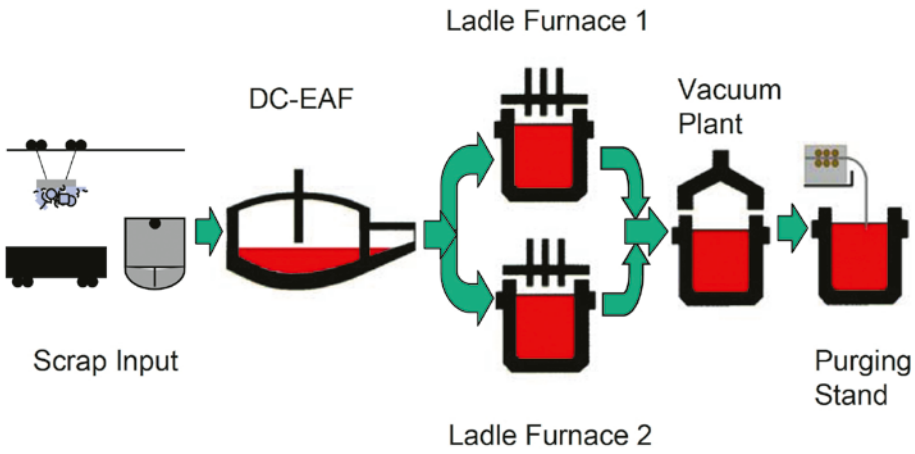


Figure 1. GMH process route (Picture: Purmetall)

Figure 2. Slide gates seen from the ladle bottom (Picture: Purmetall)

Dipl.-Ing. Marc Andre Bombeck, M.Eng. Malte Janssen, Purmetall GmbH & Co. KG, Oberhausen, Germany; Dr.- Ing. Thomas Deinet, Forschungsgemeinschaft Feuerfest e.V., Höhr-Grenzhausen, Germany; Dr. rer. nat. Amin El Gammal, Georgsmarienhütte GmbH, Georgsmarienhütte, Germany – Contact: janssen@purmetall.de

kg of ladle well filler. To examine the applied ladle well filler in the well block, this took place at the end of the refractory linings lifespan and the well block was carefully recovered at the start of the relining process. **Figure 3** shows the ladle well filler covered backup well block.

Result of the ideal application of ladle well filler is a material cone, peaking 15-18 cm above the ladle bottom. **Figure 4** illustrated the backup well block after the application of ladle well filler.

After the application of ladle well filler to the backup system, the steel ladle went through a routine production cycle lasting approximately 3-4 hours and tapping via the main slide gate system. After tapping, remaining slag was poured out and the ladle was then transported to the relining facility to cool. Subsequently the worn refractory lining was removed and the backup well block was recovered. During the removal of the well block from the bottom lining, flowable ladle well filler was lost and only solidified structures could be recovered. The well block containing solidified material was then bisected vertically along the casting channel. **Figure 5** shows one of the recovered backup well blocks.

Starting the examination from the bottom of the casting channel, the first significant feature is the dome spanned cavity in the well block. This cavity contained flowable ladle well filler until the backup slide gate system was removed and the well block was excavated from the ladle bottom lining. The shown ladle well filler starts to form liquid phases above 1,500°C, thus the flowable mass was exposed to lower temperatures. The dome above the cavity consists of a layer of sintered ladle well filler with a thickness of 3 – 6 cm. This layer formed during the cooling of the highly viscous silica melt phase covered in earlier publications. Overlying the sintered dome is a layer of steel pervaded by slag inclusions and shrinkage cavities. The boundary reactions between well block, steel and ladle well filler are subject of ongoing research. A comparison between the material cone after addition and the sintered dome shows a significant reduction in size, i.e. roughly a third of the added ladle well filler was eroded through physical mechanisms or thermochemical processes. The amount of erosion in the industrial trials varied over a wide range, determined by the duration of the secondary metallurgical treatment and the alloys in the produced steel quality. This dynamic process determines the progression of the surface of the dome into the casting channel. A more pronounced erosion of the ladle well filler and a further progression into the casting channel lead to a smaller diameter of the dome that can then withstand higher ferrostatic pressures consequently reducing the free opening rate. This is a possible explanation for the correlation of treatment duration and free opening rate which is described in numerous publications.

Interaction between steel and ladle well filler

The effect of the steel grade on the erosion of ladle well fillers was examined in laboratory tests conducted by Purmetall and Forschungsgemeinschaft Feuerfest with the goal to develop ladle well fillers especially suited for the conditions during the production of particular steel grades. To investigate the reactions between steel and ladle well filler a new crucible test, distinguished by the direct exposure of ladle well filler to liquid steel in an inert atmosphere at 1,600°C for a duration of two hours, was developed. **Figure 6** shows an example of the two component crucible test setup.

To recreate the specific working conditions, different ladle well fillers and steel grades were combined in these two com-

Figure 3. Backup well block with added ladle well filler shortly before EAF tapping (Picture: Purmetall)

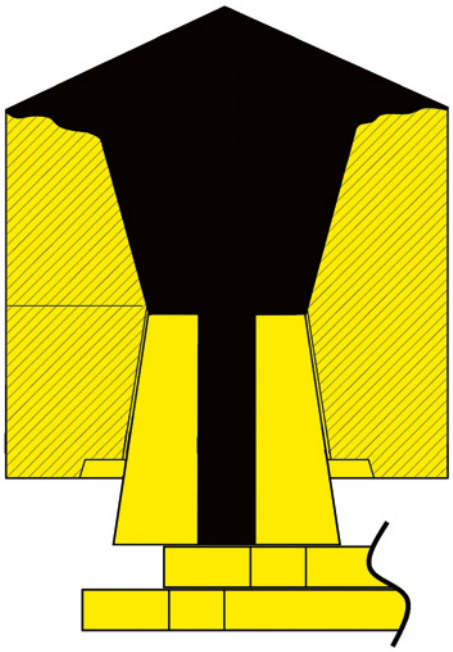


Figure 4. Illustration of the backup well block after addition of 50kg of ladle well filler (Picture: Purmetall)

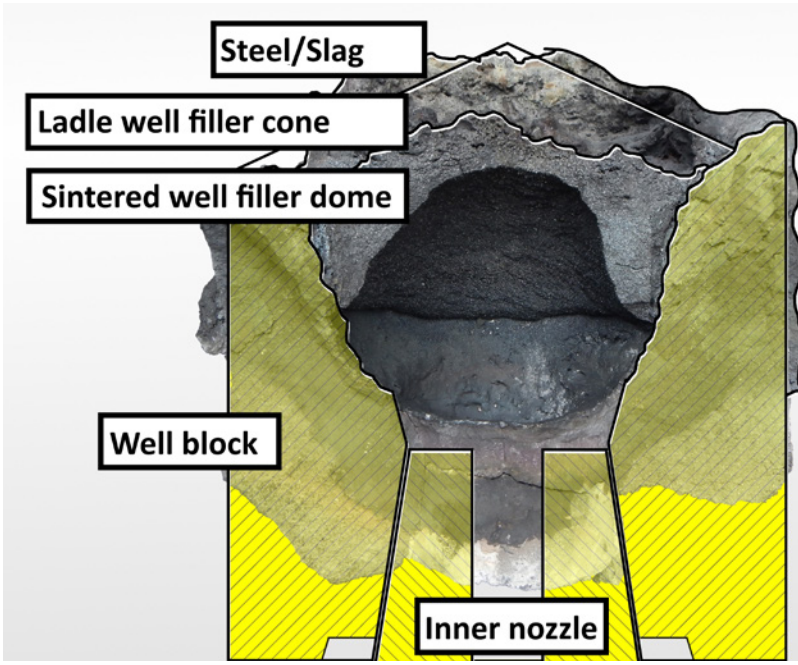


Figure 5. Bisected well block from the industrial trial (Picture: Purmetall)

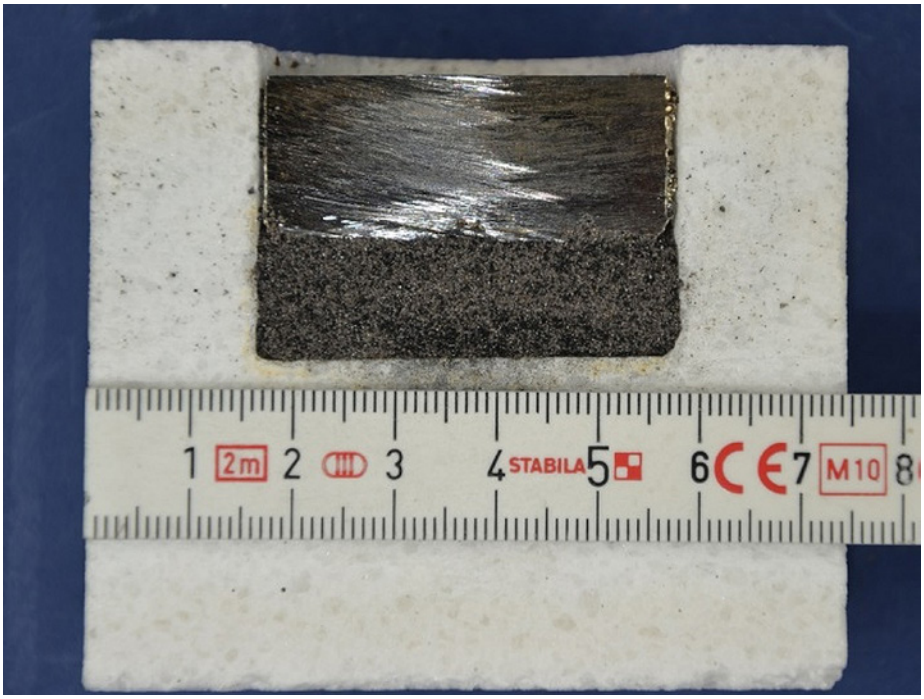


Figure 6. Setup of a crucible test with ladle well filler and steel (Picture: Purmetall)

Table 1. Chemical composition of the steel grades used in crucible tests (wt.-%)

	Fe	Cr	Al	Si	Mn
Steel 1 (ball bearing steel)	96.1%	1.7%	-/-	0.5%	1.7%
Steel 2 (high manganese steel)	78.3%	-/-	2.7%	2.2%	16.8%

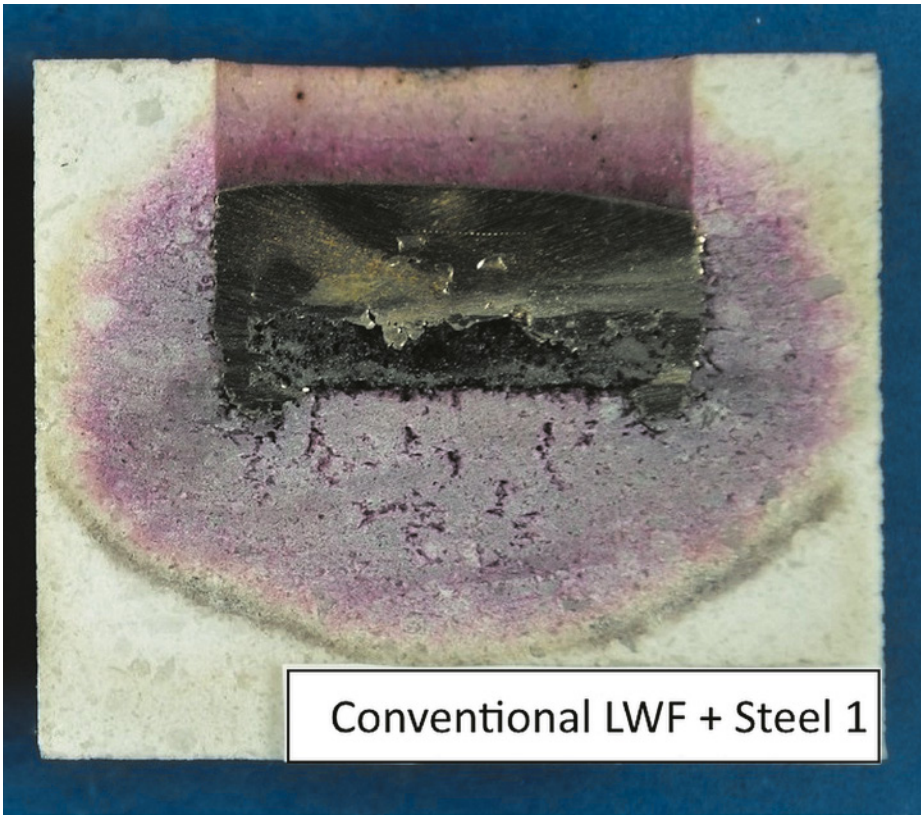


Figure 7. Crucible test 1 with conventional ladle well filler and Steel 1 (Picture: Purmetall)

ponent crucible tests. Steel grades with high manganese content regularly have lowered opening rates; therefore a 16 wt.-% Mn steel grade was included in the test series to study the effect of manganese content on the reactivity between ladle well filler and steel. Established conventional ladle well fillers were compared to newly developed compositions. **Table 1** shows the chemical composition of the two steel grades in wt.-% as measured with SEM/EDX.

The evaluation of the crucible tests was based on the visual appearance of the bisection surfaces and microstructural examination via SEM/EDX.

Visual examination of the crucible tests with ladle well filler and steel

Figure 7 shows one half of a bisected crucible with conventional ladle well filler and steel 1 (ball bearing steel). The refractory alumina crucible shows a distinct discoloration and noticeable cavitation inside of the structure of the crucible bottom. This indicates corrosion and infiltration of the crucible material by liquid phases of the ladle well filler or steel. Furthermore, the ladle well filler shows pronounced shrinkage that allowed the steel to flow along the crucible wall to the bottom of the crucible after reaching its liquidus temperature.

Figure 8 shows one half of a bisected crucible with conventional ladle well filler and the manganese rich steel 2. The original layer of ladle well filler is completely dissolved and the crucible in its entirety is infiltrated with liquid phases from the ladle well filler or steel. The crucible structure also shows strong structural decay. This is caused by intense chemical reactions between the high manganese steel, the conventional ladle well filler and the alumina refractory. This high reactivity is a cause for the regularly low free opening rates during the production of high manganese steel grades.

Microstructural examination via SEM/EDX of crucible-tests with ladle well filler and steel

Samples were taken of the present halved crucibles to prepare polished sections for scanning electron microscope analyses. **Figure 10** shows a SEM-picture of the structure in the contact-area of con-

Table 2. Semiquantitative chemical analyses via EDX (wt.-% rounded))

	0	1	2	3
MgO	10%	11%	4%	--
Al_2O_3	13%	14%	16%	--
SiO_2	--	--	66%	--
TiO_2	1%	2%	1%	--
Cr_2O_3	44%	59%	10%	--
Fe_xO_y	32%	14%	3%	--
Remark	Chromite from the ladle well filler	Boundary of chromite grain with reduced Fe_xO_y content	Siliceous phase containing oxides from the ladle well filler	Steel 1 after crucible test 96 wt.-% Fe, 4 wt.-% Cr

Table 3. Semiquantitative chemical analyses via EDX (wt.-% rounded)

	0	1	2
MgO	--	9%	--
Al_2O_3	>99%	67%	--
SiO_2	--	--	--
TiO_2	--	--	--
Cr_2O_3	--	3%	--
MnO	--	21%	--
Fe_xO_y	--	--	--
Remark	Alumina crucible	MnO-rich phase including oxides from the ladle well filler (Mg,Mn)O $(Al,Cr)_2O_3$	Steel 2 after crucible test 85 At.-% Fe, 10 At.-% Cr, 3 At.-% Mn, 1 At.-% Si

Table 4. Semiquantitative chemical analyses via EDX (wt.-% rounded))

	0	1	2
MgO	--	3%	--
Al_2O_3	--	37%	--
SiO_2	--	57%	--
TiO_2	--	--	--
Cr_2O_3	--	--	--
MnO	--	--	--
Fe_xO_y	--	--	--
Remark	Steel 2 after crucible test 78.8 At.-% Fe, 16.5 At.-% Mn, 2.5 At.-% Si, 2.3 At.-% Al	Siliceaous phase 3 wt.-% Na_2O	Manganese steel 78.8 wt.-% Fe, 16.5 wt.-% Mn, 2.5 wt.-% Si, 2.3 wt.-% Al

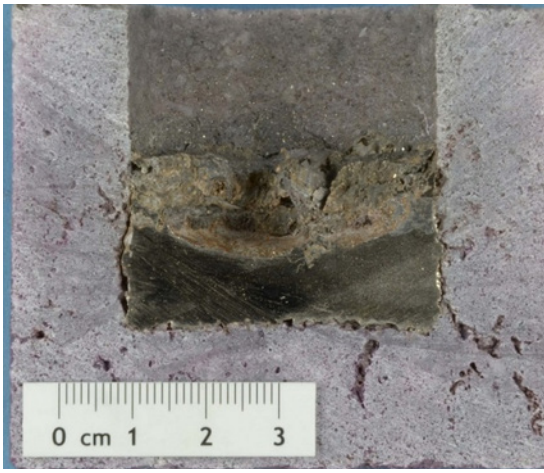


Figure 8. Crucible test 2 with conventional ladle well filler and Steel 2 (Picture: Purmetall)

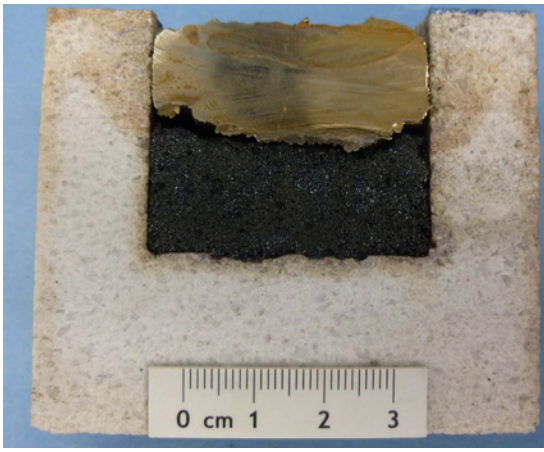


Figure 9. Crucible test 3 - new type of ladle well filler and Steel 2 (Picture: Purmetall)

ventional ladle well filler and steel 1 of crucible-test 1.

Conventional ladle well filler consists in its initial state of chrome ore and silica sand. After the thermal treatment at 1,600°C the conventional ladle well filler forms a dense texture of dense chrome ore particles (light grey) and a secondary phase which is of low viscosity at 1,600°C (dark grey). The outer rim of the chrome ore particles are reduced in their Fe_xO_y amount. The secondary formed phase consists of SiO_2 from the silica sand and the oxides of the chrome ore. This means a diffusion of the oxides MgO, Al_2O_3, Cr_2O_3 and Fe_xO_y from the chrome ore to the siliceous secondary phase took place.

Additionally, redox reactions between the conventional ladle well filler and the ball bearing steel take place. Small amounts of manganese and silicon from the steel diffuse into the ladle well filler and get oxidized (MnO- and SiO_2-pickup into the ladle well filler). On the other hand, Cr_2O_3 of the ladle well filler diffuses into the steel and is reduced to metallic chrome (Cr-pickup into the steel).

In comparison **figure 11** shows a SEM picture of the texture formed at the contact area of conventional ladle well filler

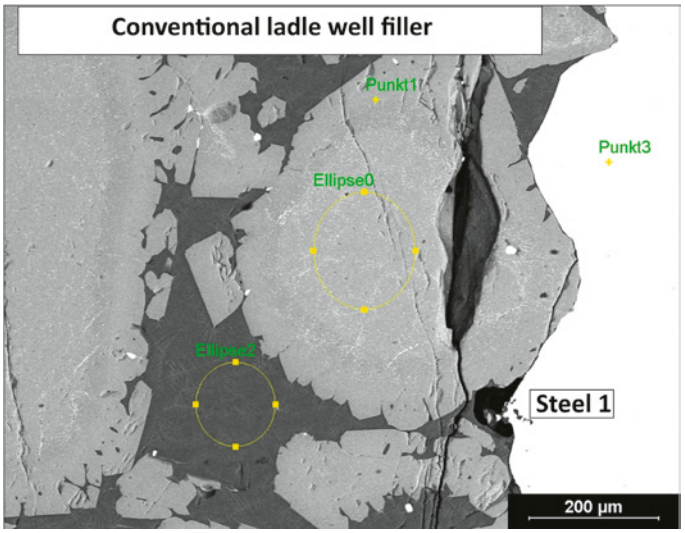


Figure 10. Microstructure of crucible test 1 - conventional ladle well filler and Steel 1 (SEM 150x) (Picture: Purmetall)

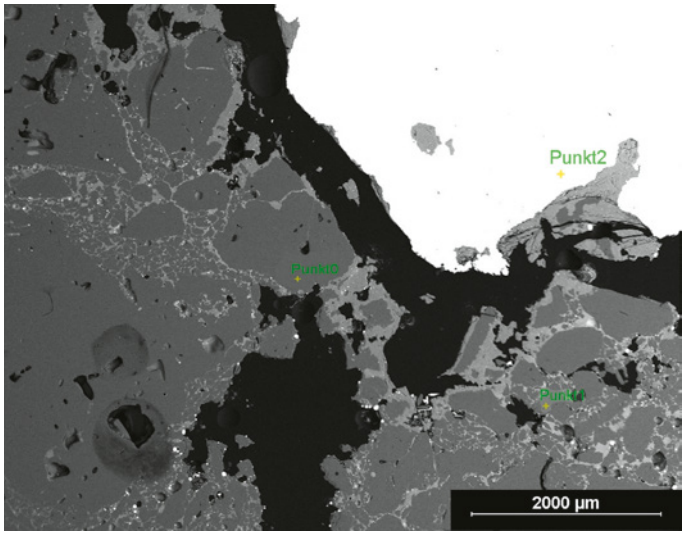


Figure 11. Microstructure of crucible test 2 - conventional ladle well filler and Steel 2 (SEM 22x) (Picture: Purmetall)

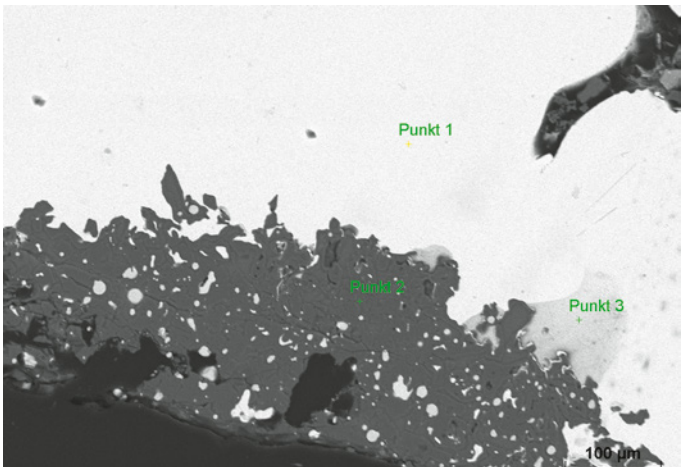


Figure 12. Microstructure of crucible test 3 - new type of ladle well filler and Steel 2 (SEM 230x) (Picture: Purmetall)

and a manganese steel 2 (crucible test 2). The ladle well filler is shown in light grey whereas the corundum crucible is shown in dark grey. It is obvious that the ladle well filler infiltrated the structure of the crucible and destroyed it. According to this a more intense contact reaction took place between the conventional ladle well filler and the corundum crucible.

Steel 2 shows in this crucible test (crucible test 2) a more intense reaction process compared to crucible test 1 showing a less intense reaction, visible by the grade of infiltration into the crucible.

Conventional ladle well filler and steel 2 do also show redox reactions, as shown by EDX-analyses (reading points 1 and 2 in **table 3**). Reading point 1 shows a MnO-rich phase which consists of MnO and oxides of the ladle well filler forming a manganese-chromite spinel. Reading point 2 of table 3 furthermore shows that steel 2 lost manganese and aluminium whereas a chrome-pickup took place. **Figure 12** shows a SEM-picture of the structure of the contact zone of a new developed ladle well filler with manganese steel 2 (crucible test 3).

During crucible test 3 no redox reactions between the new developed ladle well filler and the manganese steel (steel 2) took place. EDX analyses therefore give neither evidence on loss of Mn, Al or Si of the steel nor a Cr-pickup into the steel. These observations explain the visual impression, shown in **figure 9**, that only a small reaction potential occurs between the new ladle well filler, manganese steel and the crucible.

Conclusion

Due to field tests it was possible to demystify the behaviour of ladle well fillers during real conditions. Ladle well filler do not act as inert fillings which are heated through by the temperature of the liquid steel and therefore sinter as a function of ladle well filler thickness. In fact, the ladle well filler can be solved by thermochemical and erosive processes like tapping the furnace or rinsing treatments. These processes are time-depending, explaining why free opening rates decrease with increasing retention time of the steel in the ladle. The alloy composition of the overlaying steel strongly affects the thermochemical processes in the ladle well filler. The conventional ladle well filler completely dissolved in the presence of steel with 16% manganese content. For the ongoing development of high-performance steel grades, a new generation of ladle well fillers is necessary. Basis for the successful development of next generation ladle well fillers is the exact knowledge of the reaction behaviour of the involved oxides and elements. Identifying all available reaction partners and their impact on the reactivity of ladle well fillers during steelmaking is subject of ongoing research.

References

[1] Bombeck, M. A.; Janssen, M.; Dannert, C.; Deinet, T.; Alonso Ona, I.: Grundlegende Untersuchungen zur Funktionsweise von Schiebersanden. stahl und eisen 136 (2016) 8, 35-41

[2] Bombeck, M. A.; Janssen, M.; Deinet, T.; El Gammal, A.: Verhalten von Schiebersanden bei Kontakt mit flüssigem Stahl", stahl und eisen 139 (2019) Nr. 4, 46-50

Material-flow logistics

Save lifting and efficient transfer of slabs and heavy plates

With 40 years of experience Skanveir knows about any requirements, processes and challenges connected with lifting and moving heavy loads. Professional expertise in the field of magnetic- and vacuum-lifting technologies makes this company a reliable provider. Their own planning and production in Finland ensure high quality products.

Skanveir's core competence are lifting technologies for heavy metal. Since their founding in 1979 the Finnish enterprise put their focus on the development of magnetic- and vacuum-lifting technologies. With their tailored solutions the company provides products for customers in Northern Europe, the Baltics as well as Russia and Central Europe. The main customers of Skanveir are steel factories, steel service centres, leading shipyard Meyer as well as big and small mechanical engineering companies. "Currently we export about 70% of our products. Right now, we are trying to establish a stronghold on the German market, where we can position ourselves as a strong and competent partner for metal- and shipbuilding companies", says Mika Seppänen, CEO of Skanveir.

"We don't provide our customers with pre-made stock-solutions but customize the final product individually to fit the customers unique requirements. Before we define the conception of the lifting tools, we do a requirement analysis in close cooperation with the customer. Thereby we can make sure, that our delivered solutions fit the special requirements of our customer application. The customer can be sure to invest in a lifting solution, which perfectly meets his requirements."

Besides quality and functionality, another strength of Skanveir is the implementation of safety innovations, in which the company is a pioneer. "We are actively working on the development of dynamic lifting beams. A good example is an installation, which prevents a load from falling off a magnetic beam. Also, we are currently testing an IoT-based innovation, which allows us to check on the maintenance requirements remotely," emphasises Seppänen.

Skanveir magnetic beam with motorised telescopes allows quick and safe handling of different plate sizes (Picture: Skanveir)

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>
> *Mika Seppänen, CEO of Skanveir*

Skanveir has built a motivated team of experts in the field of lifting technologies, which is supported by a competent supply network. "We are an agile partner for our customers, who's service portfolio consists of reliable delivery, installation, teaching on site, maintenance as well as delivering spare parts. By producing our products here in Finland, we make sure, to have the whole production cycle close by. This allows us to keep the delivery process simple and easy.

Skanveir Oy, Hololа, Finland

Strip processing lines

Wiping systems for hot-dip galvanizing lines

Danieli Kohler provides wiping systems around the world to produce high-quality coated products. The ability to supply high-technology, customized solutions is the key to its success, with 200 installations in molten metal-coating lines of all types. This experience allows Danieli Kohler to push the technology to new heights in terms of performance, productivity, zinc-saving and surface-quality improvement.

A typical air wiping equipment layout is illustrated in **figure 2**. The sink/rear stabilizing roll rig (4) and front stabilizing roll rig (8) receive the strip from the furnace snout, hold it in the pot, establish entering and exiting pass-lines and work together to flatten and stabilize the strip between the air knives (3). As the strip rises from the pot of molten metal, the X-JETs meter the coating.

The precisely shaped and directed jet of pressurized air leaves a uniform coating of the correct thickness. Non-contact edge baffles (5) reduce the noise and provide consistent coating at the strip edges. The rolls and air knives are precisely and repeatably positioned by motorized mounts and fixed supports.

Highly efficient blowers provide air at the required pressure and flow rate. PLC-based automation and an advanced HMI make the operator's job simple and easy. An electromagnetic strip stabilizer can be installed to improve strip stability and shape.

Danieli Kohler product line

Danieli Kohler provides different product solutions to match customer requirements. The X-JET and Compact X-JET (CXJ) products cover all potential customers' requirements for new lines and the modular design, especially of the CXJ, allows revamping of existing systems with minor modifications and investments.

Figure 1. Danieli Kohler air knife technology installed at a continuous galvanizing line
(Picture: Danieli)

Andrea Alessandrini, Danieli SpA, Buttrio (UD), Italy
Contact: a.alessandrini@danieli.it

These new technologies, applied for pot equipment revamping, already have demonstrated a payback time between 0.5 to 1 year (depending upon product mix and metal cost). This is possible thanks to reduction of zinc consumption (even and more precise zinc distribution of the coating layer cuts down overcoating); fewer product rejects due to surface defects (better surface appearance and effectiveness of the wiping action are given by sharper air jet); and average production increase (light coating weight production is possible at higher line speeds).

Danieli Innov-Action

In galvanizing lines, the zinc pot offers the most effective way to reduce costs in operation and consumables, and at the same time to improve product quality. Insufficient wiping capacity often results in a bottleneck for line productivity and coating uniformity of the final products. For this reason Danieli concentrates its efforts in continuously innovating the wiping process.

Since 2003 Danieli Kohler has carried out an intensive R&D program on the entire wiping process, resulting in the development of fluid-dynamic models for simulating air flow within the air knives and the prediction of the final coating thickness. Danieli Research made a significant development of KOHLERJET air knives design using fluid dynamics modeling.

Since the core of the wiping process is defined by the delicate and complex fluid-dynamics phenomena that occur when the jet impinges on the coating surface, the study of a numerical modeling of air-knife wiping was carried out.

After extensive tuning on a full range of products and process parameters, these models led to a completely new design for the air-wiping system. The study clearly

indicated the directions for further development of wiping technology.

The target of the simulation campaign was to provide a complete database of cases for a general study of the jet impact dynamics and effect on the coating film. Since then a comprehensive model has been developed in order to evaluate the evolution of the coating film under the effect of the air knives.

By employing the most modern numerical simulation techniques, a useful and accurate model of the wiping equipment and process has been created. The model has been used to direct the development of improved wiping equipment with additional advantages in productivity, quality and/or energy input. The result of this R&D activity resulted in the brand-new design of Danieli Kohler X-JET air knife, featuring a more efficient jet, with sharper pressure profile and extended laminar zone.

The X-JET

The heart of the X-JET is the nozzle body and lip design that reduces turbulence, maintains a sharp pressure profile and improves uniformity across the width. Compared to previous air knife design, the new X-JET features an air-flow with a longer laminar zone plus a sharper and more efficient "knife" effect. The X-JET drastically reduces the minimum coating at high speed, achieving 39 g/m²/side at 180 m/min.

Since its operational debut in 2009, the X-JET air knife has lived up to the most optimistic projections from the simulations. More than 35 X-JET installations carried out through the beginning of 2019 have shattered all previous limits on high-speed, light coating-weight performance while optimizing quality and ease-of-use through all combinations of line speed and coating weight.

The X-JET has these key features:

- four chambers to optimize uniformity across the width of the nozzle; and
- extended length and special shape of the last chamber to re-establish laminar flow.

The result is a sharper, more focused air jet compared to other designs, with substantially better performance.

The X-JET air knives nozzle design with extended laminar zone length improves wiping capability. The immediate benefits are:

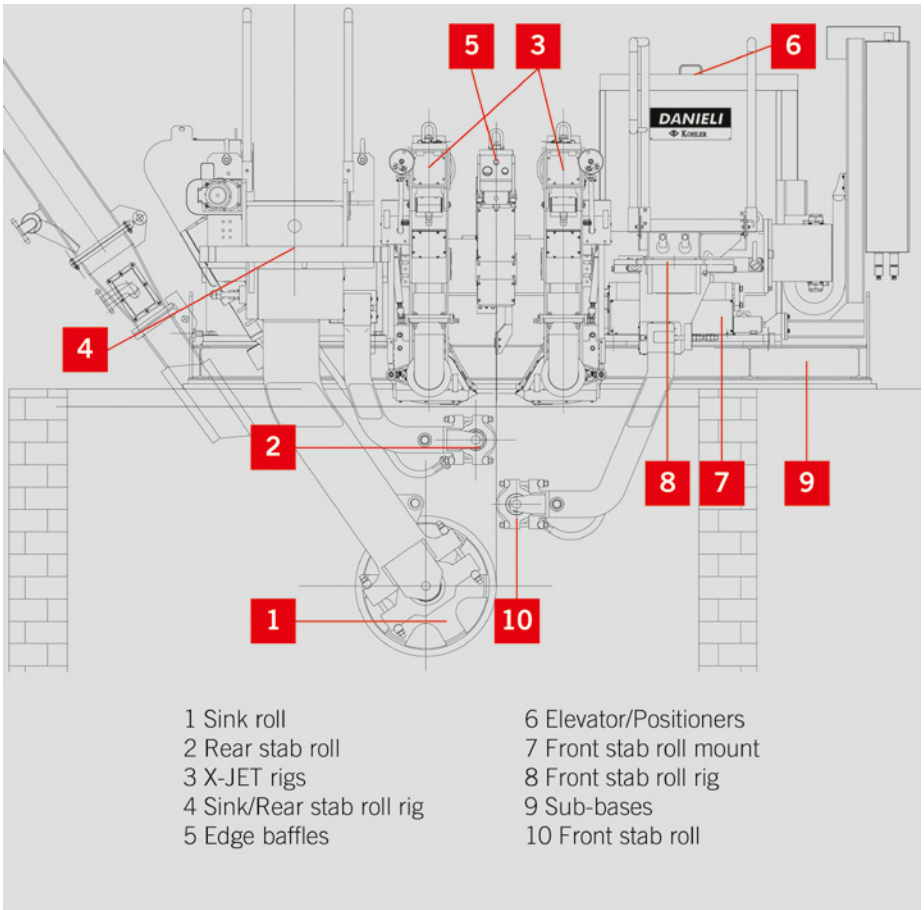


Figure 2. Typical air wiping equipment layout (Picture: Danieli)

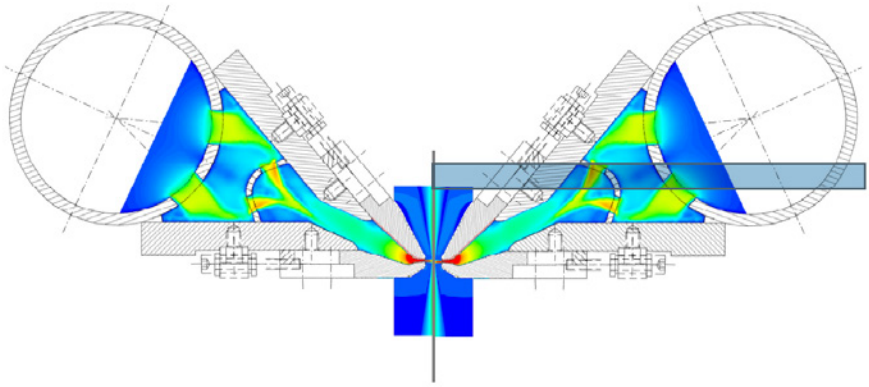


Figure 3. Fluid dynamics modeling for former KOHLERJET (Picture: Danieli)

- lower coating weight at the same speed,
- same coating weight at higher speed,
- reduced splashing and spitting,
- reduced edge overcoating.

The above-mentioned X-JET features, applied together with cutting-edge design of Danieli Kohler elevator/positioners, non-contact baffles and roll equipment, further improve wiping capability by:

- allowing flatter nozzle-gap profile,
- improving strip shape and vibration,
- reducing edge overcoating.

Another important feature of the X-JET air knife is the possibility to install the width adjustment system as a modular add-on. Since the main justification for the width adjustment comes from the use of nitrogen as the wiping fluid, it is not usually necessary for the user to include the width adjustment in the initial installation. In case the galvanized product will dictate the use

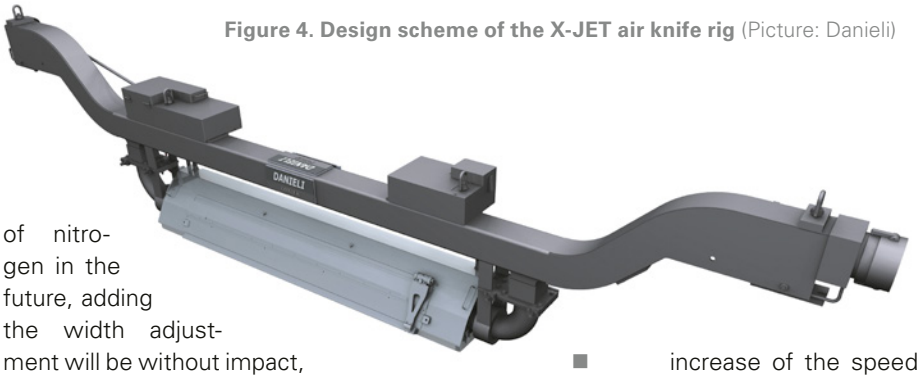


Figure 4. Design scheme of the X-JET air knife rig (Picture: Danieli)

of nitrogen in the future, adding the width adjustment will be without impact, simple, quick and inexpensive.

X-JET is rated to produce the following low coating weights at high line speeds (coating weight is indicated as the total of both sides):

- 50 g/m² (0.164 oz/ft²) at 140 m/min (459 ft/min)
- 70 g/m² (0.229 oz/ft²) at 175 m/min (574 ft/min)
- 78 g/m² (0.256 oz/ft²) at 180 m/min (590 ft/min)
- 100 g/m² (0.328 oz/ft²) at 200 m/min (656 ft/min)

Main achievements and results attributed to the X-JET

A recent revamp of a continuous galvanizing line (CGL) in South America involved supplying Danieli Kohler X-JET technology in order to change the product mix to thinner strip with light coating weight while increasing the line speed to maintain the overall production rate. The following goals have been reliably achieved:

Figure 5. X-JET system during operation (Picture: Danieli)

- increase of the speed from 150 m/min to 180 m/min for producing Z80,
- operation at 9.5 mm "knife-to-strip" distance (actual) instead of theoretical 7 mm (from the mathematical model), providing further performance potential,
- decrease of production rejects due to wiping-related defects by almost 70%.

Another X-JET revamp of a CGL in South-Eastern Asia targeting increased strip quality to serve the export market has given following results:

- decrease of coating (zinc) consumption by 5%, thanks to overcoating deviation reduction,
- improvement of surface appearance, such that the product is now accepted in all export markets.

Two X-JET revamping projects in Turkey showed that upgrade to X-JET technology allowed a payback time of only 4 months. This result is based only on a projected production increase of approximately 10%. The calculation does not account for the reduction in zinc consumption or further benefits (i.e., in both lines the wiping equipment revamping routinely produces Z80 at 180 m/min and the average coating weight of the products is now less than 100 g/m², therefore the customer has expanded its product range towards low coating weight).

Development of the Compact X-JET

Despite the proven advantages of the X-JET design for revamping projects, crowded pot areas and space constraints often are limiting factors. Lead-time and cost are increased by the need to modify or replace existing equipment. In extreme cases, it might not be practical to fit into an existing pot area at all. To overcome this limitation, Danieli returned to the same team that was so successful in its initial efforts. The new goal was to achieve the same performance in a substantially more compact envelope.

The further development of air knives resulted in the Compact X-JET (CXJ) air knife, designed to be even more easily integrated in already operating galvanizing lines. The critical dimension perpendicular to the strip is significantly reduced for the Compact X-JET (CXJ). It is now possible to fit into extremely crowded pot areas (with minimal disruption to surrounding equipment).

Features of Danieli Kohler X-JET and CXJ air-knife wiping equipment

Product quality. The new X-JET nozzle design technology, along with precise and durable lips and precise pressure control, makes it possible to process the strip at high speed with very low coating weight, while obtaining great surface appearance, visual defect reduction and zinc consumption savings (by means of uniform zinc coating distribution and minimum deviation from target weight).

Modular design allows installation of an electromagnetic strip stabilizer. The method of installation maintains easy equipment handling and process observation. The possibility to change standard rolls with coated surface rolls further improves performances for automotive or other high-quality applications.

Wiping efficiency. The elevator/positioners with high-precision horizontal (including skew) and vertical positioning of air-knife/edge baffle rigs, the stiff and proven design of automatic lip cleaner, the automatic non-contact edge baffles with precise positioning mechanism and sensors, plus the optional nozzle width-adjustment mechanisms ensure the highest efficiency in coating process management. Advanced automation for precise, repeatable positioning control with optional closed-loop coating weight control.

Equipment lifetime and maintenance. Quick-release bushing housings provide the fastest turnaround on roll changes. Roll scrapers are available on demand for high-quality production and extended campaign time, especially for Al55%-Zn

and GA. The rolls' pre-heater structure can be gas-fired or electrically heated. Properly designed maintenance buggies and tools for easy and fast maintenance improve equipment change over and setup efficiency.

Operating costs. Submerged rolls with 3-rolls/2-beams configuration for the fastest handling time reduce downtime for submerged equipment changeover. The maximum flexibility for using different types of bushings given by the CapEx, to meet customer and process requirements, optimizes OpEx for consumables.

Equipment productivity and flexibility. Quick and precise fixing system for roll rigs on mounts guarantees repeatability and reliability in re-positioning roll rigs. The possibility to switch from air to nitrogen wiping gives maximum flexibility in case of final product coating type (GI, GA, Al55%-Zn)

Pre-heating, set-up, transport and storage stands can be configured for all possible plant layouts.

Wide-open pot design for easy skimming, process observation and maintenance access and roll diameters sized appropriately for the chosen product mix also are part of the Danieli Kohler package.

Integrated technological packages. Closed-loop control for coating weight, including a sophisticated coating model, long-term adaptation functions, as well as precise controllers for air-knives distance and pressure, supports a tight coating weight accuracy and fast adjustment in case of flying product changes.

In a galvanizing line, human operation is most challenging in the zinc pot area. To reduce human intervention and health risks, Danieli-developed robotic systems designed to skim the surface of the zinc bath remove dross and place it in a dross container, or handle the zinc ingot feeding.

The Q-Robot Zinc can be fully integrated to the Level 1 automation system and automatically follows the bath level, optimizing the skimming action.

Main benefits

The features of the Danieli Kohler X-Jet air-knife wiping equipment offer the following benefits, proven by the feedback collected from our customers in 35 installations put into operation since 2009:

- easy and rapid handling during equipment change,
- minimal and simple setup, maintenance and operation,
- heavy-duty construction for minimum vibration and maximum strip stability, to improve the coating control,
- un-driven rolls turn easily under the most critical conditions,
- precise and repeatable pass-line position,
- excellent control of strip crossbow,
- zinc-resistant materials, for extended lifetime,
- increased line speed of +20 to +25% for the same coating weight,
- improved coating uniformity up to 10%.
- drastically reduced strip edge over coating problems,
- reduced splashing, which means less dross generation and improved quality (with less lip cleaning required),
- reduced surface defects and improved surface aspect,
- easier lip cleaning thanks to proven design of automatic lip cleaner and easy access for operators,
- reduced manpower requirements and improved operator health and safety,
- reduced dross skimming, up to 10% for the same operating conditions,
- reduction of nitrogen/blowers power consumption up to 20%, for the same operative conditions,
- further reduction of nitrogen/blowers power consumption, up to 35%, with width adjustment,
- reduced noise, by 1 to 4 dB(A) for the same operating conditions (with width adjustment),
- capability to produce challenging and high value-added products.

Automation and on-site services

The Danieli Automation (DA) system allows the complete control by operators with detailed diagnostic capability. All critical parameters can be monitored and adjusted from the HMI. Automatic set-up of process parameters is implemented according to material PDI.

Danieli supports customers with process know-how for the complete galvanizing process. This is presented by operators with years of experience in both actual production and in teaching users of Danieli Kohler equipment. Users are ensured a quick start-up, an efficient learning curve and continuous technical support.

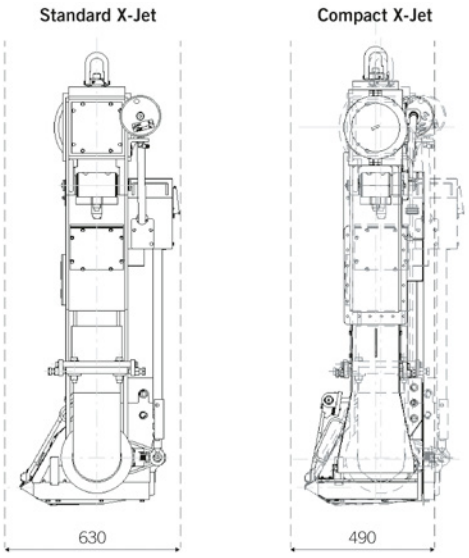


Figure 6. Main dimensional comparison between compact and normal X-JET
(Picture: Danieli)

Figure 7. Danieli Automation (DA) system allows the complete control by operators with detailed diagnostic capability
(Picture: Danieli)

Conclusion

Danieli is a leading company in the field of cold rolling and cold-processing lines through the Danieli Wean United (DWU) division. The Kohler Coating Machinery Corporation (KCMC) was integrated into DWU in 2001, establishing Danieli Kohler to bring outstanding experience in coating technology into the Danieli Group.

KCMC's long experience together with Danieli's facilities worldwide gave Danieli Kohler first-class capability in technology, research, design, manufacturing, logistics, flexibility and local customer support, as well as integrating their equipment into complete coating lines. The unique and wide-ranging expertise of the Danieli Kohler team was gained over 50 years and more than 200 installations, with feedback from market-leading galvanizers worldwide.

SES "SuperLeveler" with BTU Bridles, capable of generating 1,245 kN of strip tension in only 15.24 meters (Picture: SES Engineering)

Strip processing lines

Umlauf Bridles make pickle line at Steel Dynamics future-proof

SES Engineering LLC has upgraded a pickle line for Steel Dynamics Flat Roll Group (SDI) with the latest generation of Umlauf Bridles engineered by BTU. The SDI pickle line is the first in the world to use exclusively Umlauf Bridles for the strip transport. Umlauf Bridles build up strip tension high enough to ensure that also thick-gage and high-strength strip will leave the pickle line in a perfectly levelled condition.

Modern high-strength steels, such as AHSS (Advanced High Strength Steel) grades, feature high strength and good formability at the same time. This combination of properties calls for distinctly higher strip tension to achieve effective descaling and levelling before pickling of strip made of these steels. In order for their pickle line in Columbus/Mississippi to come up to the demands posed by advanced high-strength steels and be fit for growing future quality requirements, the management of Steel Dynamics Inc. (SDI) decided to have the entry section of the line revamped.

The existing pinch roll units, consisting of five rollers each and arranged ahead and after the tension leveler, were unable to produce the required strip tensions, especially when dealing with thick gage strips. Also threading of the strip was rather complicated, and the existing leveler required a great deal of maintenance.

The objective

The main objective of the project was to achieve a fundamental improvement in the descaling and levelling result. At the same time, higher yield, shorter threading times and higher availability were to be achieved – the latter primarily by reducing the time and effort of maintenance and repairs. The strip velocity was to be retained at the original level of 150 m/min (500 FPM).

One important constraint of the project was that the new equipment was not to use any more space than the existing one. Another challenge was the available time window: between the disassembly of the existing equipment and the restart of the line, less than three weeks were scheduled to perform all installation and associated activities.

When screening the market for a new tension leveler, it soon turned out that all common technologies were unable to successfully cope with the requirements of advanced steel grades. Some machines failed to produce the required strip tensions, others were not able to reliably prevent slippage of the strip, a potential risk of surface damage. With some designs, threading proved to be rather cumbersome and the drives required intensive maintenance. None of the systems evaluated met SDI's requirements for high-strength and thick-gage steel strips.

The solution

Therefore, SES Engineering proposed to install a new tension leveler and Umlauf

Ian Bowman, Dan Cullen, SES Engineering LLC, Alliance, OH, USA; Michael Umlauf, Member of the Management Board, BTU Bridle Technology, Hagen, Germany – Contact: www.btu-bridle.de

Bridles from BTU. The latter would be used to produce the high strip tension required for advanced steel grades. Thanks to their specific design, Umlauf Bridles can apply much higher forces onto the strip than e.g. conventional bridle rolls – while requiring less installation space. What is more, they apply the strip tension uniformly over the entire strip width and rule out the risk of lengthwise scratching of the strip surface. Umlauf Bridles have been in operation in several European plants for more than 25 years, with operators reporting very good performance and low equipment maintenance.

Due to the convincing concept of an integrated solution and the good experience with Umlauf Bridle technology reported by other steel companies, SDI's management chose the solution proposed by SES: a 140 ton SuperLeveler provided by SES and two Umlauf Bridles – one arranged ahead and one after the leveler.

The scope of supply additionally included a third Umlauf Bridle arranged in the run-out section of the pickle line. This configuration has made the line in Columbus the world's first pickle line to use exclusively Umlauf Bridle technology to move the strip through a pickle line.

SDI placed the order for the project with SES as general contractor in February 2018. Project work on site started on 25 January 2019: SES disassembled the complete entry section equipment between the pay-off reel and the pickling tank entry, as well as the pinch roll unit at the line exit. They then installed and commissioned the three Umlauf Bridles and the levelling machine complete with the associated electrical and automation systems. After successful hot commissioning, the pickle line went back on stream on 10 February – i.e. only 17 days from the start of the disassembling work.

Ahead of the leveler, the first Umlauf Bridle performs as a braking unit and the second one, arranged behind the leveler, as a pulling device. In this set-up, the Umlauf Bridles – each requiring an installation length of only 2,200 mm – generate strip tensions of up to 1,250 kN to level the strip. The first Umlauf Bridle in the line bites the head of the up to 13 mm thick and up to 1,880 mm wide strip, guiding it directly into the tension leveler.

The third Umlauf Bridle arranged at the run-out of the pickling section bites the head of the pickled strip and guides it into

The Umlauf principle

Umlauf Bridles consist of two crawler-type chain units featuring an elastic padding. One unit is arranged above and one below the strip. They guide and transport the strip linearly, i.e. without any deflection, at different stages of strip processing lines. Thanks to their extreme compactness, Umlauf Bridles can be arranged at basically any position within the line.

By applying the force over an area – and not concentrated in one point – any local concentrations of forces or relative movements between the crawler unit and the strip surface are prevented. Therefore, the risk of surface damage is ruled out, making this technology highly suitable for delicate strip surfaces.

A single Umlauf Bridle unit may be used to apply large forces to the strip, for example, in order to pull it through side trimmers or slitting lines. This aspect is of particular interest especially when processing thick strip. The unit may also be installed to decouple the strip tension of a line section from upstream processes or even reduce the strip tension to "zero". By reducing strip back-tension to "zero", an Umlauf Bridle makes it possible, for example, to measure the flatness of the strip without any interfering effects.

As the Umlauf Bridles are arranged within the strip processing line, they build up the strip tension before the coiler bites the strip head. This significantly increases the usable coil length, in other words the yield. In certain strip processing lines this may lead to a plus of 20 meters per coil.

Umlauf Bridles can be rotated very precisely through their vertical axis. This feature allows them to reduce strip camber during stretch leveling and correct the strip run so as to achieve highly precise trimming or recoiling.

Entry section of the BTU Umlauf Bridle (Picture: SES Engineering)

An Umlauf bridle shortly before installation (Picture: SES Engineering)

the recoiler, adjusting a back-tension that is optimal for the specific recoiling process. A special feature of the Umlauf Bridle is that it can rotate through its vertical axis. This ensures perfectly straight-edged recoiling.

First experience

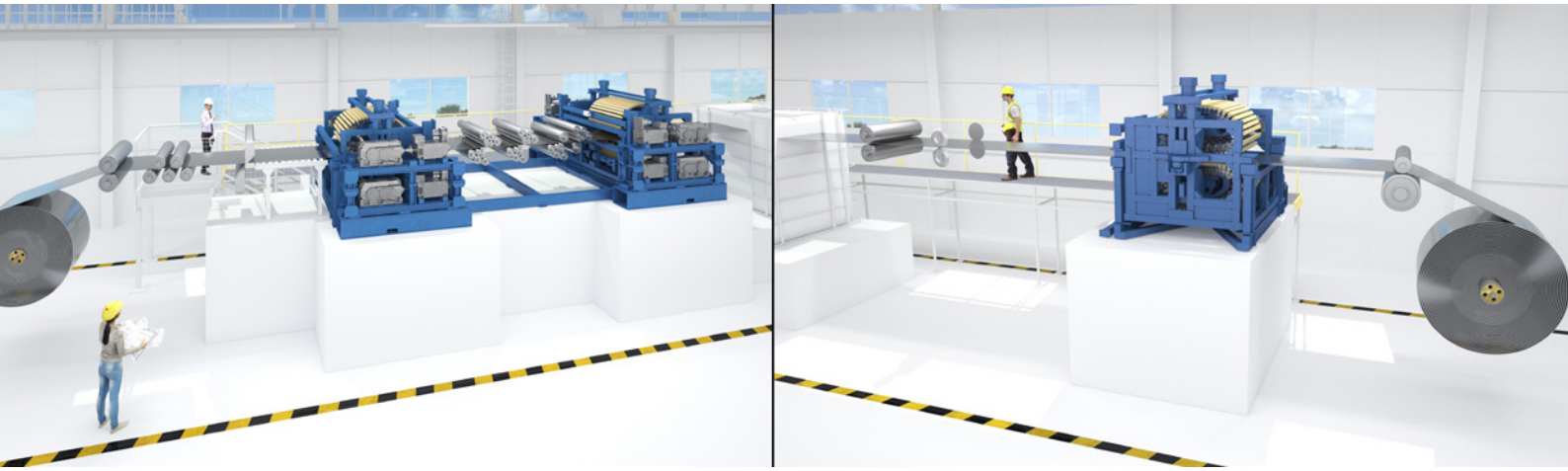
The line currently produces pickled & oiled, mild steel, high-carbon, HSLA and AHSS steels in gages between 1.5 mm (0,060") and 12.7 mm (0,500") with yield strengths between 1,700 and 7,500 N/mm² (25,000 to 110,000 PSI). Strip tension is now triple the value it used to be with the old tension leveler. It is also extremely uniformly distributed over the entire strip width. The new line achieves up to 1.5% strip elongation normally and up to 3.0% on some products, an amount high enough to ensure effective levelling and descaling. Strip flatness has also been impressively improved: for example, strip of over 300 I Units flatness was levelled to just 10 I Units.

A further advantage is that the strip is subjected to the correct strip tension as soon as the second Umlauf Bridle bites the head of the strip. This means that, apart from about two meters at the head and tail, the strip is stretched immediately and over its complete length exactly with the tension required.

Also the threading process has become much more reliable: the rotating crawler-type chains of the Umlauf Bridles securely "catch" the strip head – even if the heads bend up or downwards (ski formation). With the old equipment, threading usually took about 2 to 3 minutes. Sometimes manual intervention was required, often extending the time needed for threading to up to 30 minutes. Now every strip is threaded fully automatically within 45 seconds at a speed of up to 45 m/min (150 FPM).

As the second Umlauf Bridle actively pulls the strip through the leveler, the leveler does not require any drive equipment of its own. This reduces investment and maintenance costs and prevents the rollers from slipping. While strip tension is being built up, the first Umlauf Bridle operates in generator mode.

Jeffery McLain, Finishing Mill Manager SDI is sure that the company took the right decision when opting for Umlauf technology: "Almost all our objectives have been fulfilled: we reach the high strip tensions needed to achieve excellent descaling results and to be able to level high-strength, thick-gage strips with the same high precision. We have reduced the time needed for strip threading dramatically. Our customers and downstream operations have reported that they prefer to run material that has run through the Super-Leveler with the BTU Bridles. The sum of all these achievements has made our pickle line fit for the growing future challenges of the market."



At the entry section (left) the two Umlauf Bridles produce strip tensions of up to 1,250 kN, whereas at the line run-out (right), the third Umlauf Bridle creates the back-tension needed to produce exactly wound coils (Picture: BTU Bridle Technology)

Tubes & Pipes

Efficient production of large-diameter pipes in the Emirates

Al Gharbia Pipe Company has successfully taken into operation its new LSAW (Longitudinal Submerged Arc Welded) pipe plant. The pipes to be produced will mainly come in grades suitable for use as onshore or offshore line pipes, including sour-gas applications.

The new LSAW large-diameter pipe production facility at Al Gharbia Pipe Company was built at the Khalifa Industrial Zone Abu Dhabi (KIZAD), by a consortium of Larsen & Toubro Limited and SMS group (www.sms-group.com) as the EPC (Engineering, Procurement, Construction) partner. SMS group was responsible for the engineering and supply of the process equipment for the large-diameter pipe production facility, Larsen & Toubro Limited for the civil works, balance-of-plant and erection of the equipment.

The pipes to be produced on the LSAW facility will mainly come in grades suitable for use as onshore & offshore line pipes, including sour-gas applications. Al Gharbia is going to produce up to 12.2-meter-long pipes with outside diameters ranging from 18 to 56 inches. The maximum wall thickness is 44.5 millimeters; steel plates up to grade X80 can be processed. The plant is designed for a production capacity of 240,000 tons per year.

SMS group supplied all core machines and the process equipment including workshops, laboratories and a manufacturing execution system (MES), besides the engineering and project planning, scheduling and coordination. The production line comprises an edge milling machine, a crimping press, a second-generation JCO® pipe forming press with modular frame design, tack-welding machine, inside and outside welding machines, mechanical expander and a hydrostatic pipe tester.

The JCO® pipe forming process provides numerous benefits. For example, the plant operator can quickly change over to other pipe dimensions allowing even smaller batch sizes to be produced economically and with utmost precision. The Shape Automation System developed by SMS group directly determines the optimal machine parameters and fully automatically controls the forming process. The system minimizes the effect of yield strength deviations in the plates during forming guaranteeing a consistently high pipe quality.

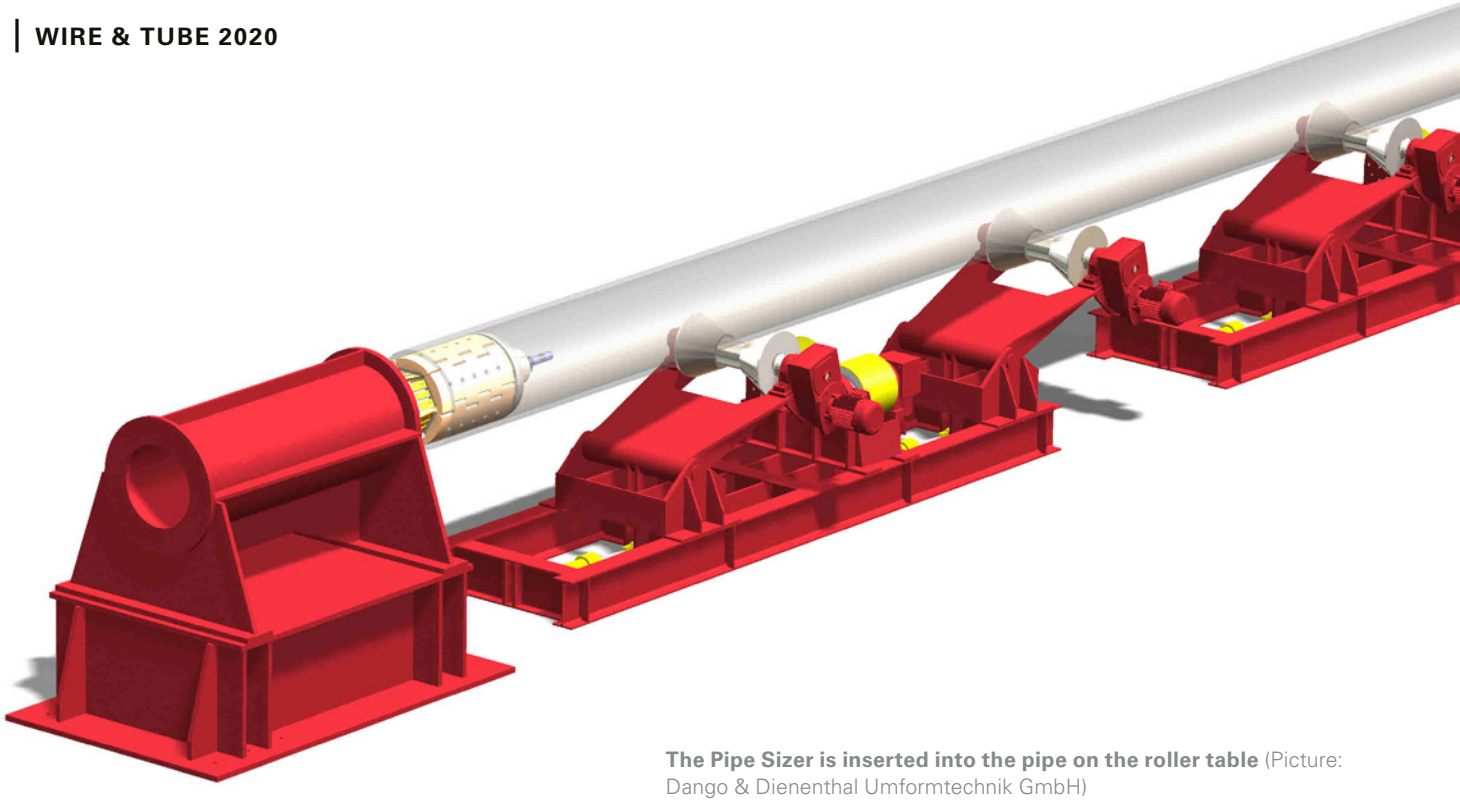
The JCO® pipe forming press and the crimping press are equipped with variable speed pumps (VSP), assuring an efficient hydraulic system, that dispenses with any proportional valves. As a result, abrasion is reduced and hydraulic pressure losses minimized. Further benefits include short piping paths and small oil tanks and the possibility to feed compression energy back into the network as electrical energy. Compared to conventional hydraulic systems, this reduces energy consumption by up to 50 percent.

Al Gharbia Pipe Company can now manufacture large-diameter longitudinal welded pipes made of quality steels – mainly for the energy sector – targeting markets in Bahrain, Kuwait, Oman, Saudi Arabia and the United Arab Emirates.

Al Gharbia Pipe Company is a joint venture of investment company Senaat, JFE Steel and Marubeni-Itochu Steel (MISI). The new company leverages JFE Steel's technology for high-quality large-diameter longitudinal welded steel pipes, MISI's sales capabilities and Senaat's industrial expertise in Abu Dhabi.

SMS group

Al Gharbia Pipe Company has successfully taken into operation the new LSAW pipe plant (Picture: SMS group)



The Pipe Sizer is inserted into the pipe on the roller table (Picture: Dango & Dienenthal Umformtechnik GmbH)

Premiere at Tube 2020

Laser technology facilitates pipe sizing

At the upcoming Tube 2020 trade fair, Dango & Dienenthal (D&D) is going to unveil its new laser-supported tool for high-precision sizing of pipes. The new tool dramatically cuts the time needed for pipe sizing.

The Pipe Sizer achieves its extraordinarily high precision level thanks to an accurate sensor which measures the internal contour of the pipe simultaneously. The "tool" of the system is the expander. This unique component features six axially arranged expandable forming dies that cover the entire internal circumference of the pipe. Each die can be expanded separately by means of a hydraulic cylinder. As each cylinder can be individually actuated, it is possible to size the pipe ends highly precisely and efficiently by actuating only those dies relevant for the sectors of the pipe circumference that need sizing.

Unique about this pipe sizing tool developed by D&D is that it comes with a 360° circumference laser which measures the internal contour over the pipe's complete circumference, generating – in real time – an exact high-resolution image of the internal pipe wall.

High-precision input for high-precision control

The Pipe Sizer is inserted into the pipe on a roller table. The 360° circumference laser measures all geometry data needed for the subsequent sizing process. From these measurements, the dedicated software calculates the actuation values for each one of the six expandable dies.

During the sizing process, the dies are individually expanded exactly to the point and with the pressure needed to achieve the desired internal contour of the pipe.

Circular laser triangulation

The recently patented 360° circumference laser measures the internal contour of seamless and longitudinally welded pipes in a non-contact process based on the circular laser triangulation technique. It captures the internal contour along the complete pipe length, immediately generating a complete 2D image of the internal pipe wall from the measured data.
This innovative measuring system, arranged at the head end of the Pipe Sizer operates on the laser triangulation principle. A laser, accommodated in the measuring head, projects a line onto the complete internal circumference of the pipe. The measuring head also contains a camera which captures the projected line at 2,048 pixels arranged around the internal pipe circumference, equaling an angular resolution of 0.17 degrees. By calculating the individual distances from the axis, the software generates an exact image of the internal contour of the pipe.
The resolution of the distance measurements equals 0.1 percent of the measured area: in a pipe of 500 mm radius, for example, the resolution would be 0.5 mm.

When the process has been completed, the laser re-measures the contour. In the event that the pipe wall has sprung back, the control software re-calculates the actuation values for a second sizing cycle and the sizing process starts anew.

Each one of the six dies covers a sector of 60°. It may happen that the contour measurements show that the pipe wall needs to be expanded at a point located between two adjacent dies. In this case, the pipe can be rotated on the roller table.

The first pipe sizing machine of this type designed by D&D will be used for sizing the ends of pipes with diameters ranging between 400 and 1,000 mm and wall thicknesses between 20 and 60 mm.

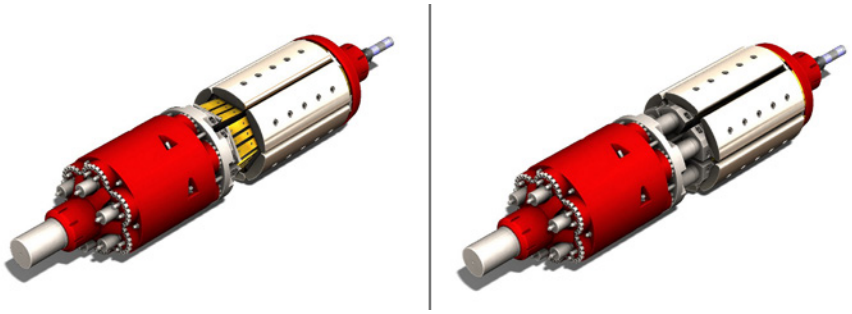
Denis Albayrak, Sales Manager at Dango & Dienenthal Umformtechnik, describes the benefits for producers and processors of tubes and pipes: "The inline laser measurement makes it possible, for the first time ever, not only to obtain information about the internal geometry of a pipe "live", during the sizing process, but to actually use this information inline for the control of the sizing operation in process. This shortens the entire procedure while achieving ultra-high precision."

Best fit and full body expansion

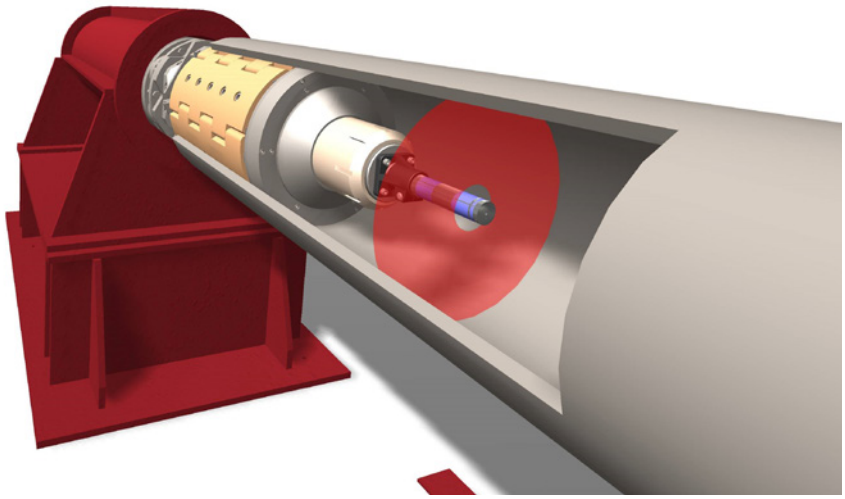
With the contour measurement by a laser it is now possible to introduce 100% pipe inspection without having to set up a time-consuming procedure. Gapless documentation of the geometry – inside diameter and ovality, for example – no longer poses a challenge. This data can even be used to apply the Best Fit process, a highly efficient process to optimize line pipe welding assembly operations.

Moreover, the new laser-based sizing technology also enables the sizing of pipes along their full body. The demands on the quality of pipes – especially, in terms of perfect roundness – have become increasingly exacting during the last few years, presenting pipe manufacturers constantly with new challenges. Here the new laser-supported tool has the potential to accelerate the pipe sizing process perceptibly and reduce the number of out-of-spec pipes shipped.

Dango & Dienenthal Umformtechnik GmbH, Siegen, Germany



The expandable forming dies in retracted position (left) and actuated position (right) (Picture: Dango & Dienenthal Umformtechnik GmbH)



The camera captures the line projected onto the internal pipe wall by the 360° circumference laser arranged on the head end of the Pipe Sizer (Picture: Dango & Dienenthal Umformtechnik GmbH)

Superlative in Düsseldorf, Germany

Even bigger and boasting an enhanced concept: wire 2020 and Tube 2020 trade fairs

Innovative technologies will be presented at wire and Tube trade fairs from 30 March to 3 April 2020 at Düsseldorf fairgrounds. The trade fair duo wire and Tube expects in excess of 70,000 visitors from some 130 countries in 2020.

From 30 March to 3 April 2020 Düsseldorf Exhibition Centre will again turn into the global information and communication hotspot for the key players in the wire, cable and tube industries. In 2020 the "trade fair heavyweights" for these industries will again bring together some 2,600 exhibitors on total net space of 115,000 square metres in 15 exhibition halls.

The special benefit: for the first time the new multi-purpose Hall 1, which holds up to 10,000 people with its 12,027 square metres, will offer Tube exhibitors new presentation options. Furthermore: finished products will be featured for the first time in the ranges of wire 2020. Fasteners and springs will be on display in Halls 16 and 17.

Ranges of wire 2020

In 2020 wire will be presented in Halls 9 to 12 and 14 to 17. On show will be machinery and equipment for wire manufacturing and wire processing, process engineering tools and auxiliaries, materials, fibre optic technologies, special wires and cable as well as innovations from the area of measuring, control and automation technology.

In addition to wire and cable machinery manufacturers, wire and cable products, and dealers in Halls 9 to 12 and 14 to 17, mesh welding machines will be exhibited in Hall 15. They face logistics with demanding challenges since this heavy machinery requires especially thick cables in the supply ducts to be installed and connected to supply the power needed for operation.

In Hall 13 Chinese exhibitors will again be showcasing their wire and cable solutions under the heading meet China´s expertise.

A premiere in Halls 16 and 17: for the first time the complete value chain for fasteners and springs will be presented here. Alongside raw materials, machinery and equipment the finished products – fasteners, connectors and industrial springs – will be on show. This means that wire Düsseldorf will be the new information and order platform for manufacturers, distributors and buyers of screws, fasteners, construction and fitting components, all types of springs and bent wire parts from 2020.

Ranges at Tube 2020

The entire process chain of the tube industry will be presented at Tube 2020 – in a focused and consistent manner in Halls 1,3,4, 5, 6, 7.0 and 7a. The extensive ranges include machinery and equipment for tube manufacturing, tube treatment and processing as well as raw materials, tubes and accessories, second-hand machinery, process engineering tools, auxiliaries plus measuring, control, automation and inspection technology. These ranges are complemented by tube and pipeline trading, OCTG- technology as well as profiles, machines and plastic tubes.

Tube manufacturers and distributors are located in Halls 1, 3 and 4 and therefore have ample space to exhibit their machines, equipment and products extensively. Following on from these halls are the tube processors in Halls 5, 6 and 7a. In Hall 7.0 pooled tube competence from China can be found with the slogan meet China´s expertise.

International satellites on dynamic markets of the future

In the space of over 30 years wire and Tube Düsseldorf have developed into the leading trade fairs in their industries – and there are now also eleven international satellites revolving around the themes of wire, cable and tubes. In their regions they are market leaders, the driving forces for local industries enjoying high growth potential. Satellites in Russia, Brazil, China, Thailand, India, and the USA form part of the portfolio of the Metals & Flow Technologies trade fairs made by Messe Düsseldorf.

The Düsseldorf Exhibition Centre will again be the global hotspot for the wire, cable and tube industries (Picture: Messe Düsseldorf / ctillmann)

Messe Düsseldorf

Cold-formed hollows for automotive application

Cold-forming replaces multi-step manufacturing processes, while cycle time of one second sets new standard.

The hollow sections are fed from a magazine (top), up to 60 pieces per minute leave the machine ready for installation (Picture: Aachener Maschinenbau GmbH)

Tube 2020 trade fair will see the unveiling of AMBA's new cold-forming machines for hollow ends. Thanks to their unique operating principle, these machines guarantee precise alignment of the hollow ends, while achieving highest throughput rates.

In order to ensure a perfect, backlash-free fit of the hollow ends in the receiving mounting part, the hollow ends have to be manufactured with paramount precision. It is critical for the hollow ends to be perfectly aligned in the axial direction in order to preclude any risk of the components being distorted during the assembly process. Until now the hollow ends used to be shaped by machining, or as weldments to achieve the desired shape of the hollow ends. However, with those methods, production rates of up to 60 items per minute were not realistic.

In contrast to this, the new RH 08 synchronous machine from AMBA forms both ends simultaneously. This operating principle ensures that during forming both hollow ends stay perfectly aligned with each other. With a cycle time of approximately one second, the machine achieves an extraordinarily high output. The hollow sections leave the machine ready to be installed, requiring no additional machining.

The first machine of this type – which will be supplied in the spring of 2020 to a component manufacturer for the automotive industry - will be designed with upsetting force of up to 25 t at either end, enabling the machine to process steel and stainless steel hollows with outside diameters of up to 20 mm. The two forming stations arranged in the axial direction of the work piece feature fully automatic, high-precision positioning systems, which allow for hollows in lengths between 450 and 800 mm to be processed on the machine.

AMBA Aachener Maschinenbau GmbH, Alsdorf, Germany

Premiere of ecoMetals tours on the occasion of the wire and Tube 2020 trade fairs in Düsseldorf

Sustainable, eco-friendly, energy saving and innovative: this is how most manufacturing companies wish to come across to the public.

However, the road to reach this goal is a long and winded one, especially for resource-intensive technology companies in the wire, cable and tube industries. It often takes companies years to comply with the requirements relating to climate efficiency, sustainability and resource-saving processes.

All the more reason why Messe Düsseldorf is now focusing on an ecoMetals campaign during the leading international trade fairs wire and Tube: for the entire duration of the trade fair from 30 March to 3 April 2020 there will be guided tours – so-called ecoMetals tours – offered to the stands of exhibitors who produce in a sustainable manner that saves resources and cuts emissions. Exhibitors will inform participants on the ecoMetals tours personally and in detail about innovations at their stand. The guided information tours are free of charge and will start at the ecoMetals information counter at the Nord entrance.

Messe Düsseldorf

Tube 2020 accompanying programme: Tube Experts Meeting and TubeForum

At the Tube 2020 trade fair, stahlnews.de will be organizing the Tube Experts Meeting on the evening of the first day of the fair, March 30, 2020 (hall 1, room 15 – start at 6 p.m.).

Under the motto "Materials, technologies and markets – the future of the tube industry" renowned and recognized industry leaders have registered their presentations, amongst others Antonio Marcegaglia, Chairman and CEO Marcegaglia Group; Hanns-Jörg Westendorf, CEO Hoberg & Driesch; Dr. Dirk Bissel, CEO Vallourec Germany. After the course of presentations attendees will have ample time to network.

In addition, the **TubeForum** will be conducted on Tuesday, March 31, 2020. With the same slogan, the event will take place also in Hall 1, Room 15, from 2 to 5 p.m. Selected exhibitors will give a 30-minutes presentation about the company and its products.

stahlnews.de

Increasingly electrified

Electric mobility to spread out much faster than expected

According to the German Association of the Automotive Industry (VDA), electric vehicles are suitable for the market. A "young, still small market with high dynamics" has developed around e-cars - even though vehicles with combustion engine technology currently still dominate the global automotive market. Suppliers of the wire and cable industry are already picking up speed and see e-mobility as an opportunity.

Wafios, globally leading manufacturer of wire and tube working machines, is convinced, the market potential is enormous. "Accordingly, the forecasts are positive", Wafios emphasises. For this reason, e-mobility became the focus of the company's attention already some years ago. "Technical triggers were enquiries from the automotive sector, both on the OEM side, supplier level and in the equipment sector about three years ago," explains the supplier of machines for bending wire and tubes. E-mobility picked up speed.

However, the industry is still "clear and concentrated on a few market participants", explains Wafios. According to AlixPartners Global Automotive Outlook 2019, the global market share of electric drive units in terms of vehicles sold amounted to 2.7 per cent in 2018. A share that is clearly expandable, which is shown by the growth rate of the e-drive of more than 65 per cent. Thus, according to Outlook 2019, the market is speeding ahead "in the irreversible market run-up".

According to VDA, electric mobility is coming faster than many expect. One reason is, for example, the tightening of regulations and the improved incentive systems for electric mobility in order to reduce CO_2 emissions. For example, there will be no new registrations for conventional drives in Norway from 2025 - the sale of electric cars will be promoted with massive tax incentives. The Netherlands, Ireland and Israel want to use only emissions-free vehicles from 2030. A sales ban on combustion engines is planned from 2040 in Great Britain and France. In the USA some states, such as California, plan to permit only emissions-free cars from 2040. In order to get their act together, suppliers have to target these figures.

Globally, a drastic increase in hybrids and electric vehicles can be expected between 2020 and 2025. The VDA predicts that "by 2030 a production share of electrified vehicles of 60 per cent or more worldwide is likely". China will be a pioneer here - every third vehicle could be fully electric by 2030. In Western Europe, the share could rise to 25 per cent due to stricter regulations and driving bans. According to the association, a breakthrough in Africa and South America is not to be expected so soon. For Japan, Korea and North America, a share of hybrid vehicles of around 80 per cent would be conceivable. The car world is electrified - a realistic view.

Electric mobility may come faster than many expect (Picture: Pixabay)

Huge investments required

Car manufacturers and automotive suppliers must therefore make massive investments: The AlixPartners Global Automotive Outlook 2010 reports that at least 202 billion euros will have to be spent globally over the next five years to master the technological change to the electric drive and the development, production and marketing of up to 300 planned new e-vehicles. "The level of investment is still out of all proportion to demand," says Dr Elmar Kades, Global Co-Lead Automotive and Managing Director at AlixPartners. At the same time, the current and expected weak sales development for the next few years will increase the short-term pressure on the margins and cash flows of the suppliers, Kades continued. Weak sales and massive investments therefore coincide.

Even though the situation is challenging, the wire and cable industry remains optimistic. "Electrically powered vehicles promise higher sales for our company because more or higher quality cables are needed," explains Leoni. Hybrid vehicles, in particular, which contain both an electric and a combustion engine, require a higher product share from the company.

High-quality cables are required in various areas of the electric car: In the charging cable from the charging station to the vehicle system and from the charging connection to the battery. Lines finally transport the electricity via the inverter to the

electric motor. The internal wiring supplies other high-voltage components, such as air-conditioning compressors or electrical heating, with energy.

Battery cabling and connector systems

Leoni is focusing, in particular, on the high-voltage battery as an energy storage device for electric vehicles and plug-in hybrids. The company concentrates primarily on data and power distribution within high-voltage batteries. "We assume that the HV battery in future vehicles will contain parts of the previously exposed high-voltage cable harness due to its large-area arrangement." The aim is to offer customers system solutions for battery cabling from a single source. Together with its partner Diehl, the company is working on offering complete solutions. Already established products of both companies in areas such as cabling, connector systems and cell contacting would be combined to form a complete package. This means that sustainable strategies are needed.

Laser for copper welding

Trumpf is also experiencing electric mobility as a growth-promoting driving force. A central role is played by a new laser, the development of which the laser specialist has accelerated in the course of its e-mobility strategy and which, according to the company, is proving to be very suitable for welding copper. Copper is considered to be the most important material for conducting electricity and an electric car would be inconceivable without it. With the new laser, copper can be efficiently welded, for example, for the high-performance electronics of electric cars. "The shift towards electromobility offers great opportunities for German industry," emphasises Christian Schmitz, Managing Director for Laser Technology at Trumpf. The company expects further growth for its own business as a result of the changes in the automotive industry. Compared to the previous year, the company's sales of products and solutions that flow directly into electromobility have doubled. "20 per cent of our order intake from the automotive industry now comes from electromobility, twice as much as last year," Schmitz continued.

Products and processes are changing

Changing times require flexible suppliers - the right curve position is crucial. You must bear in mind that the exhaust gas and fuel system, the combustion engine and the low-voltage vehicle electrical system are not required for the less complex electric drive. Instead, they must adapt to electric motors, cooling systems for electronics and batteries, chargers, a high-voltage electrical system and a PTC heater – components that sometimes require high-performance wires and cables to prevent vehicles from stuttering.

Audi Hungaria starts series production of electric motors (Picture: AUDI AG)

The changes associated with the switch from combustion to electric vehicle technology are therefore fundamental and affect products and processes. "Competencies such as blow moulding, pipe extrusion and machining technology are also becoming less important, while processes such as winding processes and forming techniques for parts made of aluminium and magnesium are gaining in importance," explains the VDA. In order to continue on the road to success, the wire and cable industry must therefore flexibly steer in the right direction. Then it will head full speed towards high profits.

Messe Düsseldorf

Hot forming of fastener heads and pins

Three-die press accelerates hot heading by up to 30 per cent

A newly developed upsetting press has been designed with three positions of the die. Hence, it chronologically separates the "inserting", "heating", "heading", "cooling" and "discharging" operations from each other. This enables the machine to reduce cycle times by up to 30 per cent.

Up to now, it has been customary to use dies with two opposing mountings for hot heading of fasteners (screws/bolts), ejector pins for mould-making and perforating pins and needles. A new pin was inserted in the upper position while the pin in the lower position was being headed. The die was then turned through 180°, the pin cooled down and was then discharged. Insertion, cooling and discharge all took place in the same mounting, with the result that the sum of these operations determined cycle time. The consequence: it was necessary to wait for sufficient cooling, particularly in the case of thick material, despite the fact that heating-up and heading had long since been completed.

To overcome the obstacle and speed up cycle time, special-machine manufacturer Krott + Heuter has developed the ZKSTA series of automatic hot heading machines. It features a newly developed star die with three separately cooled mountings arranged in a star configuration. While a finished pin is being removed from the first position and a new one inserted, another pin is being inductively heated and upset simultaneously in the second position. The pin cools in the third position. The star rotates by 120° to the next position after each cycle. The process that determines cycle-time is now heating up, and there is no longer any need to wait through the unproductive cooling phase.

Users report that they have been able to boost the output of their production lines by up to 30 percent thanks to the separation of heading, cooling and discharge. The new machine has now passed its trials at a renowned manufacturer of punches and ejector pins.

The technology in detail

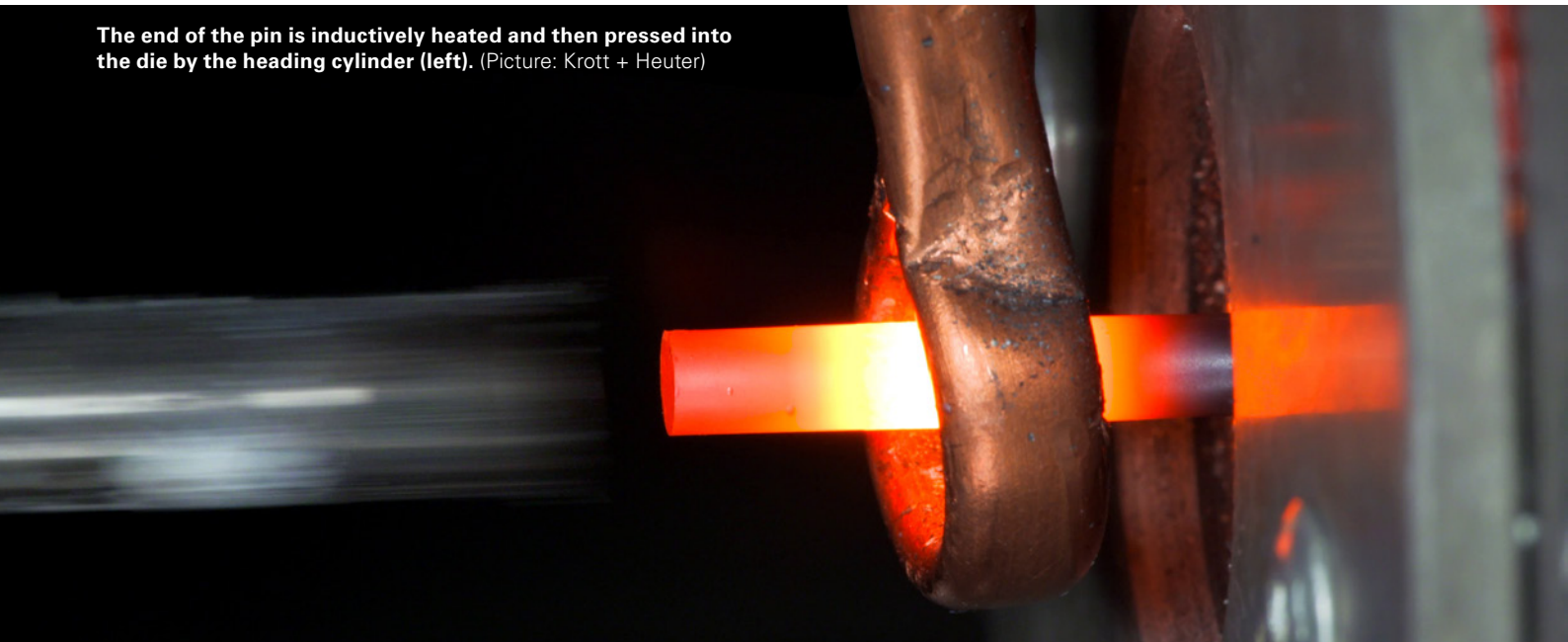
The machine described above upsets pins of diameters between 2 and 8 mm with an upsetting force of up to 200 kN, although significantly larger dimensions and upsetting forces, of up to 1,000 kN, are also possible. The machine's high level of precision also permits the production of fastener heads with special geometries, such as types bevelled on one side, for example, or pins featuring various special head shapes. The automated machine can also be used for cold upsetting of softer materials, such as structural steel, aluminium or brass.

The pins are automatically inserted, measured and upset to the precise final head dimension by means of a servo-controlled stop plate, with the result that every individual head is completely filled.

The servo-hydraulically actuated upsetting cylinder can be operated power-controlled or deformation-controlled. Unlike conventional systems, which require large quantities of hydraulic fluid, the new system does not include any external fluid supply. There is no separate tank for hydraulic fluid, and the machine therefore has a footprint of only around 1.0 m × 3.0 m.

These heading units have maintenance intervals of around 20,000 operating hours. Technically, they are automatic upsetting machines and are thus not subject to European mechanical and hydraulic press legislation.

Krott + Heuter GmbH, Stolberg, Germany



The end of the pin is inductively heated and then pressed into the die by the heading cylinder (left). (Picture: Krott + Heuter)

Anniversaries around the globe

Benteler celebrates decades of metal processing competence

In 2019, twelve Benteler locations around the world celebrated major anniversaries. Amongst the plant anniversaries are Burgos, Spain (30 years), Chrastava, Czech Republic (20 years) and Chongqing, China (1 year). All plants demonstrate: their products originate from the region for the region. This ensures customers get the best-possible on-the-spot support.

Benteler is a global, family-owned company serving customers in automotive technology, the energy sector and mechanical engineering. As innovative partner, Bentler has considerable capabilities to design, produce and distribute safety-relevant products, systems and services. Twelve Benteler locations have achieved significant milestones in 2019: from Chongqing, China completing its first year of operation to Chrastava, Czech Republic and Burgos, Spain reaching their 20th and 30th.

Each of these plants demonstrates Benteler's local-for-local approach – that means being as close as possible to its business partners. Not only in terms of geographical proximity, but also strategically. This ensures customers get the best-possible on-the-spot support. "Wherever our customers are in the world, we are there for them," says Birgit Held, Vice President Corporate Communications/ Marketing. "We congratulate our employees in the plants on their anniversaries. We're very proud of their commitment. Over the years, they have successfully worked to develop Benteler. As a result of their efforts, we have become a leading global partner of the automotive industry."

Benteler is also a partner for its local communities. At certain locations, the company is one of the largest employers in the region. Benteler offers local employee development programs and collaborates with local educational institutions. In addition, raw materials, goods and services are mainly purchased locally. In doing so, Benteler creates added value for the respective region.

Plant anniversaries illustrate Benteler's metal-forming expertise

In **Burgos, Spain,** the Benteler plant is celebrating its 30th anniversary. Benteler España in Burgos was the company's first plant outside Germany. It specializes in hot and cold forming, and welding. The plant manufactures up to 16 million chassis and structural components per year. Since it opened, the Burgos employees have processed over 400,000 tons of recycled steel – enough to build 164 Eiffel Towers.

About 2000 kilometers away, the **Chrastava plant in Czech Republic** started production in 1999, manufacturing painted and unpainted components. Over the last 20 years the paint line has coated 23.5 million sq. meters of metal – enough to cover the whole of Slovenia.

In **Kaluga, Russia**, the Benteler plant is celebrating ten years of production. In that decade, the module assembly plant has welded over 4,000 kilometers of metal seams in the manufacture of components. That's almost the distance from Kaluga to the Benteler location in **Chongqing, China**, which was celebrating its first birthday last year. The plant is Benteler's 15th in China. It produces rear subframes and steering components for a leading Chinese car manufacturer. One year after it opened, the plant has put seven different chassis assemblies into production and already delivered its 200,000th component. Placed on top of each other, the stack would be four times higher than Mount Everest.

Metal processing competence since 1876

At these and all other Benteler locations, customers benefit from more than 140 years of metal processing competence in steel and aluminum. Benteler uses this broad material expertise to develop cost-efficient and best-in-class manufacturing processes. Today, products from Benteler can be found in almost every car worldwide. The company's expertise in metal processing, for example in lightweight construction, will be even more in demand in the future. This way Benteler supports its customers in the development of safe and eco-friendly mobility solutions.

Benteler AG, Salzburg, Austria

Booth of Benteler at Tube 2018 trade fair in Düsseldorf, Germany (Picture: Messe Düsseldorf, ctillmann)

Deep drawing of sheet metal

Monitoring metal sheet infeed during the pressing process

In cold forming processes, deep drawing is considered a decisive step in the production process. optoNCDT 1420 laser triangulation sensors measure the metal sheet infeed during pressing, as this parameter is crucial for the quality assessment of the process. Due to their robust design, these sensors are insensitive to shock and vibration. Based on innovative sensor technology, the measured results are constantly precise even under challenging conditions such as parts with different reflection characteristics.

optoNCDT1420 1420 sensors measure the metal sheet infeed during deep drawing
(Picture: Micro-Epsilon)

A blank to be deep drawn is pressed by the ram into the die (mould). The flange of the sheet is partially pulled inwards and distortions can occure at the edges of the flange as a result of the deep-drawing process, when the material "flows" below the blank holder from the outer area into the die. The distortion can be detected as a change in distance. This value is crucial for the quality assessment of the pressed part.

The measurement of the distortion is carried out using several optoNCDT 1420 laser triangulation sensors, which are placed around the blank, either directly installed in the die or blanholder – or aside the die. Due to their extremely compact design, these sensors can be effortlessly integrated into a small space. The arrangement is chosen in such a way that the laser beam is directed on the edge of the sheet, which is between the blank holder and the die. Due to the extremely small measurement spot size, the laser is able to measure extremely tight gaps between the two tool parts of less than one millimetre.

The measured values are transmitted via analogue or digitally to the controller. They allow a conclusion to be drawn on how much material has flowed. This enables, for example, the pressing forces to be controlled during the ongoing process, reducing waste, material consumption, downtime and costs.

Even when exposed to harsh ambient conditions, laser triangulation sensors from Micro-Epsilon provide reliable measurement results. They are rugged and can withstand high mechanical loads such as vibration and shock. The Auto Target Compensation (ATC) feature rapidly compensates for different reflections caused by high-gloss through to dirty-matte sheet metal parts, while enabling a smooth distance signal.

Micro-Epsilon

Dillinger steel builds bridges

New Moselle bridge built with heavy plate steel in various qualities

The new Moselle bridge in the Rhineland Palatinate of Germany has been opened to public traffic in November 2019. German steel company Dillinger played a major role, with more than 25,000 t of heavy plate provided for the construction of the bridge.

Crossing the valley of the Moselle river, this new bridge is one of the highest and longest in Germany. The height of the piers and spans reaching up to 210 metres required a multitude of planning, assembly and organizational innovations in order to complete the beam bridge. The highest pier measures about 150 metres, the lowest about 20 metres. The distance between the piers ranges from 105 to 210 metres. The structure's height of 160 metres exceeds even that of the Cologne Cathedral and its length, at 1.7 kilometres, is six times the length of the London Bridge.

Dillinger steel was selected for the project due to the special dimensions and the associated requirements for the building materials used. For individual elements such as piers and substructures, Dillinger supplied heavy plate steel in various qualities and in thicknesses ranging from 8 to 125 millimetres. Much of the steel was delivered to the construction site from Dillingen by barges via the Saar and Moselle rivers – an environmentally friendly option, as it seems natural for building a river bridge.

The Moselle bridge is the centrepiece of a 25-kilometre section of the new dual carriageway construction project for the new Bundesstrasse B50 major road in Western Germany. The bridge enables vehicles to drive through what was formerly described as "Europe's most expensive dead end." The B50 is intended to facilitate the road traffic between Luxembourg, the Belgium and Dutch deep water sea ports and the greater Frankfurt area. At the regional level, the Eifel and Hunsrück regions in Germany are now connected via the A60 autobahn and the B50 Bundesstrasse.

Dillinger supplied more than 25,000 t of heavy plate for the construction of the new Moselle bridge, one of the highest and longest in Germany (Picture: Dillinger)

Aktien-Gesellschaft der Dillinger Hüttenwerke (Dillinger), founded in 1685, is a world leader today in the manufacture of high-grade heavy plate steel. The Dillinger Group employs a total of about 7,400 people and has annual sales of around two billion euros. High-tech plate from Dillinger is used to realize extraordinary and technically sophisticated projects all over the globe, including in the areas of steel construction, engineering, offshore, offshore wind power, and line pipe and boiler construction.

Dillinger

Bringing a historical building back to life

Transformation of an iconic London landmark

The seven-stage transformation of Battersea Power Station will turn the Grade II-listed structure from a dormant shell into a thriving community.

Tata Steel's plant in Shotton, North Wales, has supplied the premium steel flooring for one of the UK's biggest-ever construction projects – the revitalisation of iconic south London landmark Battersea Power Station. The contribution is a crucial component of a multi-billion-pound development project to turn the former power station into a hub for businesses, community and even Apple's new London headquarters.

To date, Battersea Power Station has required 135,000 square metres – enough to cover two football pitches – of composite floor decking to meet the complicated design brief for the development.

> Our ability to offer support and thorough advice for such a complex package helped us win the contract – our customers know they can count on us for quality at every stage of a project.
>
> *Jo Evans, Managing Director, Building Systems UK at Tata Steel*

Tata Steel supplied all internal floors through its trademarked product, ComFlor®, a lightweight composite flooring system, with the strength to achieve the load and span requirements for complex designs and also minimising the number of lorries needed to deliver material to site, reducing site congestion and lowering the carbon footprint.

The seven-stage transformation of Battersea Power Station will turn the Grade II-listed structure from a dormant shell into a thriving community. When completed in 2025, the area's riverside will be opened to the public for the first time.

Jo Evans, Managing Director, Building Systems UK at Tata Steel, said: "The team at Shotton is proud to have developed the quality steel that has played a role in bringing one of London's most iconic buildings back to life. We collaborated closely with William Hare, steelworks contractor, to provide guidance on the type of flooring needed, detailed technical information and ultimately, our ComFlor product. Our ability to offer support and thorough advice for such a complex package helped us win the contract – our customers know they can count on us for quality at every stage of a project."

Battersea Power Station stands on the south bank of the River Thames and is known for its four chimneys and art deco design. A former coal-fired power station, Battersea closed in 1983 and remained empty until renovations began in 2013. It will ultimately become a modern mixed-use development including residential homes, a new tube station, office and retail space, a library, a medical centre, a concert venue for 2,000 people, and 100 new retail, food and drink units.

Cranes, trains and Battersea Power Station (Picture: Anthony Baines)

Tata Steel Europe, London

AVIC Shaanxi Hongyuan Aviation commissions new clutch-operated screw press

AVIC Shaanxi Hongyuan Aviation Forging Co. has put into operation its new clutch-operated screw press supplied by SMS group.

The SPKA-type clutch-operated screw press installed at AVIC's site in Xi'an, Shaanxi Province, has a screw diameter of 1,330 mm, a hard-on-hard blow force of 365 MN, a gross power of 27,000 kJ, and a weight of 2,900 t. The press offers tremendous flexibility when it comes to optimizing the forging process, and requires far less stroke to achieve the pre-set ram speed than a conventional slipping-wheel screw press. Clutch-operated screw presses are particularly suitable for high-energy forging. AVIC will use the new press for the forging of structural components, aviation discs and turbine blades for the Chinese aviation industry.

SMS group

The joining of screw and nut for the SPKA for AVIC Shaanxi Hongyuan Aviation Forging (Picture: SMS group)

Partnership between Elisa Smart Factory and Tata Consultancy Services

Under a recently signed collaboration agreement, Elisa Smart Factory and Tata Consultancy Services (TCS) will jointly undertake efforts to market and deploy Elisa Smart Factory IIoT and advanced analytics solutions to a broad spectrum of industry manufacturers.

Visualized design of a manufacturing facility (Picture: Elisa Smart Factory)

Elisa Smart Factory, providers of artificial intelligence and Industrial IoT solutions for industry manufacturers, and TCS, an IT services, consulting and business solutions organization, have joined forces to enable industrial customers to transform their manufacturing operations and improve operational excellence and flexibility.

Manufacturers will benefit in the form of increased quality, yield and machine uptime enabled by real-time monitoring, 3D visualization and advanced analytics from the new partnership, which brings together Elisa Smart Factory's solutions and TCS' IoT business framework and smart manufacturing capabilities.

Elisa Smart Factory, Tata Consultancy Services

Nucor acquires TrueCore

Nucor Corporation has announced that it is acquiring TrueCore, LLC, an insulated metal panel manufacturing company with a facility in Laurens, South Carolina.

TrueCore produces insulated metal panels serving the cold storage market, with future plans for additional commercial and industrial applications. TrueCore currently has 26 employees and will become part of Nucor Buildings Group. TrueCore has plans to add additional products to their portfolio, including insulated roof panels and a line of fire-rated panels. The coming months will see the start of construction on new facilities to serve the Western and Midwestern markets.

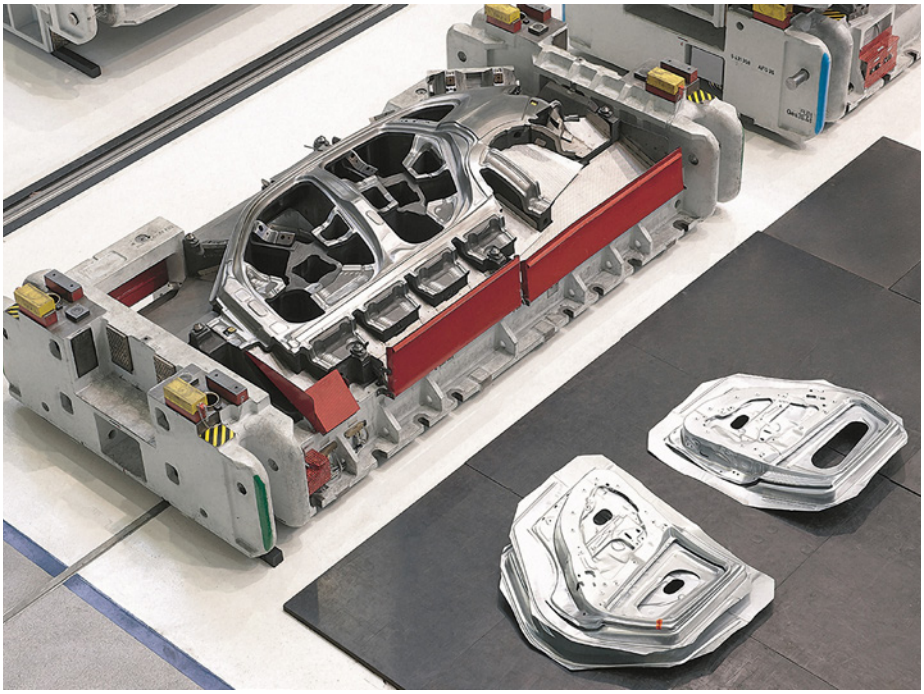
"This acquisition fits well with our strategy to profitably grow our value-added product portfolio and provides great synergies with Nucor Buildings Group," said Chad Utermark, Executive Vice President, Fabricated Construction Products.

Nucor

Schuler Pressen to divest die construction business unit

Schuler Pressen GmbH has reached an agreement with a strategic investor group based in Munich, Germany, regarding the takeover of its die construction activities in Göppingen and Weingarten.

With effect from February 28, 2020, the investment companies Navigator Capital GmbH and Accursia Capital GmbH will



Die for the production of pressed parts for car bodies (Picture: Schuler)

take over Schuler's former Body Panel business unit including the respective around 200 employees.

The new owner will operate the business unit as Cartec Tooling GmbH under the umbrella of the planned company Deutsche Werkzeugbau (DWB), which already owns the company Gebr. Rath Werkzeugbau in Kreuztal, Germany. Cartec mainly specializes in the construction of dies for the production of car body panels, expanding the product range of Gebr. Rath Werkzeugbau, which focuses on high-strength materials for the automotive industry.

The aim of the investor group is the long-term development and expansion of an international industrial business with a focus on manufacturing. Die construction is an important part of this plan.

Schuler

SLM Solutions and Honeywell partner to qualify new additive manufacturing technology

SLM Solutions is going to work with Honeywell, a leading user of additive manufacturing technologies, to help qualify new additive manufacturing parameters that enable printing at increased thicknesses.

SLM Solutions' robust Selective Laser Melting metal additive manufacturing systems optimize fast, reliable and cost-efficient production for complex, completely dense metal parts. SLM Solutions has been continuously working to reduce build times by combining high-powered lasers with advanced parameter sets.

As part of the partnership, Honeywell's Aerospace business will begin qualification efforts for aluminium builds using increased layer thicknesses of 60 and 90 µm on the SLM®500. SLM Solutions will provide their standard aluminium parameter sets for Honeywell to complete material qualification utilizing the quad-laser systems to achieve optimal material properties. The partnership will help both companies reduce printing times and costs.

SLM Solutions

Shape Corporation wins Swedish Steel Prize 2019

Representatives of US-based Shape Corporation accept the award in Stockholm (Picture: SSAB)

United States-based Shape Corporation has won the Swedish Steel Prize for the groundbreaking use of martensitic steel in a 3D formed tube for automotive roof rail applications.

The Swedish Steel Prize, which celebrated its 20th anniversary last year, recognizes good engineering, cooperation and steel innovations that lead to a better and more sustainable world.

Shape Corp.'s cost effective and robust manufacturing process for 3D shaped tubes made it possible to utilize the cold forming martensitic steel Docol® 1700M from SSAB for a unique lightweight solution for A-pillar and roof rail tubes, with a minimal profile size. The components will soon be implemented in a number of Ford vehicles, including the 2020 Ford Explorer and 2020 Ford Escape.

Thanks to 3D forming, instead of hydroforming, Shape Corp. has succeeded in creating smaller profiles than traditional solutions, allowing for better driver visibility, more interior space as well as better packaging of airbags. The 3D formed A-pillars also have an improved strength-to-weight ratio, which has led to an overall mass reduction of 2.8 to 4.5 kg per vehicle.

The other finalists of the competition were Austin Engineering from Australia, Kampag from Brazil and Roofit.solar from Estonia.

SSAB

NEW MEDIA INFORMATION 2020

Here you can go directly to the current media kit:
www.homeofsteel.de

Contact person:
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DVS MEDIA

EU emission trading scheme

Will carbon border tax adjustments represent a new frontier in trade policy?

The EU ETS scheme is fundamentally altering the economics of metals and fertilizer production in Europe. The current pathway is unsustainable, amid high costs, weak market conditions and intensifying international competition.

In this context, the EU Commission is planning to impose carbon border tax adjustment (CBTA) – a tariff levied on carbon emissions embodied in imported goods into the EU – to "level the playing field". Such measures have significant potential to redraw the competitive landscape for these strategically critical industries. But their ultimate impacts are highly uncertain and substantively dependent on policy and market specificities. What does is mean for your business?

European metals markets under pressure with a fundamental policy shift seeming likely

The EU ETS scheme is fundamentally altering the economics of metals and fertilizer production in Europe. The European carbon price has rallied to over €25 a tonne of carbon dioxide (CO_2), and is set to rise higher in the longer term, fundamentally altering the economics of metals and fertilizer production in Europe.

With metal production costs in Europe – already high by international standards in many cases – rising faster than among producers in competing jurisdictions, the future of much of the European metals industries looks uncertain. It is likely that further policy reforms will be required to ensure sustained industrial activity in a higher carbon price world.

The EU Commission is planning to impose CBTA to "level the playing field". The new president of the EU Commission, Ursula von der Leyen, has made no secret of her plan to introduce a CBTA (a proposal that has long had support of powerful European stakeholders, including the French authorities). Officials are now understood to be drafting guidelines for potential carbon tariffs on steel, cement and power industries. Aluminium, copper and other base metals are also likely to fall under the eye of the policy makers.

About he authors: CRU offers unrivalled business intelligence on the global metals, mining and fertilizer industries through market analysis, price assessments, consultancy and events.
Since its foundation by Robert Perlman in 1969, CRU has consistently invested in primary research and robust methodologies, and developed expert teams in key locations worldwide, including in hard-to-reach markets such as China.
CRU employs over 280 experts and has more than 11 offices around the world, in Europe, the Americas, China, Asia and Australia. The office in Beijing opened in 2004 and Singapore in 2018.

Ben Jones, CRU Managing Consultant

News brief

Metalshub adds long-term contracts to services

Metalshub, the digital platform for buyers and sellers of metals and ferroalloys, has launched a new feature enabling long-term contracts in addition to spot transactions.

The new feature of the trading platform provides two new elements that simplify negotiations for long-term contracts. First, the multiple deliveries feature enables buyers to specify the total quantity of material with the possibility to include volume optionality. Second, the new index-based contract feature allows buyers to choose from multiple indices in the market and thus define the index they want to base their contract price on.

20 months after launch, more than 600 producers, consumers and traders of commodities from over 50 countries have registered, including industry leaders such as Outokumpu, Saarstahl, Gerdau, Traxys, Euromet, Hempel Intermétaux, Rio Tinto, Glencore and Anglo American. To date, over 2,500 negotiations have taken place on the platform and the volume of concluded binding contracts has reached US$ 90 million. The platform currently offers 17 product categories; boron, chrome, cobalt, copper, manganese, molybdenum, nickel, niobium, phosphorus, pig iron, recarburiser, silicon, sulphur, tin, titanium, tungsten and vanadium, each metal with multiple subcategories.

By enabling long term contracts, Metalshub expands its services and is taking another step towards the team's vision: To reduce transaction costs for commodities which are not traded over a liquid exchange.

Metalshub

Automotive supply chain

thyssenkrupp supplies Volkswagen in Portugal on a just-in-time basis

From its Palmela plant the steel company offers its longstanding client custom services along the entire value chain and develops them further to meet the growing requirements of its customer with new, tailored solutions.

One of Europe's most popular compact SUVs rolls off the production line in the Portuguese city of Setubal: the VW T-Roc model. For the production of this car, Volkswagen puts its faith in the supply chain experts from thyssenkrupp Materials Processing Europe's unit Palmetal in Palmela, just a few kilometers away. Employees work in 19 shifts seven days a week to ensure that the right material for the T-Roc is delivered to the Volkswagen Autoeuropa plant in the right quality at the right time. thyssenkrupp Materials Processing Europe, a subsidiary of thyssenkrupp Materials Services, offers its longstanding client custom services along the entire value chain and develops them further when required to meet the growing requirements of its customer with new, tailored solutions.

"For example, based on an in-house development we have automated almost all our assembly and delivery processes to match Volkswagen's requirements. We can identify when material is needed at an early stage and trigger new delivery orders. Volkswagen can focus fully on its core activities while we provide tailored logistics and just-in-time deliveries," says António Novais, Managing Director of Palmetal. The basis for this approach is a clear and precise process chain which helps reduce waiting times to a minimum and enhance the efficiency of deliveries for customers. Quality of delivery is therefore consistently of the highest standard in meeting the required volumes.

Expansion of supply chain expertise

The Portuguese site was established in 1993 to supply Volkswagen Autoeuropa and has grown constantly since then. It now has five buildings covering almost 30,000 square meters. Solving complex challenges for customers and developing tailored supply chain services are core competencies of thyssenkrupp Materials Services. Increasingly, the western world's biggest materials distributor is also managing large parts of the supply chain for its customers so that they can focus fully on their core business.

As a leading steel and aluminum service center, thyssenkrupp Materials Processing Europe, a company of thyssenkrupp Materials Services, serves customers from the automotive, electrical, construction and furniture industries from thirteen locations in six countries. Backed by many years of expertise in procurement, consulting and prefabrication, the processing specialist supplies tailored services and digital solutions for flat steel and nonferrous metals to a wide range of customers throughout Europe.

> Volkswagen can focus fully on its core activities while we provide tailored logistics and just-in-time deliveries
>
> *António Novais, Managing Director of Palmetal*

thyssenkrupp Materials Services

António Novais, Managing Director of Palmetal (Pictures: thyssenkrupp)

The Palmetal site comprises five buildings covering almost 30,000 square meters

International Intralogistics and Forklift Truck of the Year

Combilift nominated in two 2020 IFOY award categories

For the second year in a row Combilift is a finalist in the IFOY Awards – one of the most prestigious and hotly contested international awards in the materials handling industry. The company is the only manufacturer to have two of its products nominated for a 2020 IFOY Award (International Intralogistics and Forklift Truck of the Year) which honours the best products and solutions of the year.

The Combi-CBE4 is a finalist in the Special Vehicle Category. This 4000kg capacity electric powered, all-wheel drive forklift incorporates compact counterbalance design with multidirectional capability for the versatile handling of mixed sized loads. It features the company's internationally patented independent electric traction (EP.2956350) which provides all front and rear drive wheels with 100% traction control, therefore negating the need for differential lock on slippery surfaces. By inputting the wheel-base parameters, the traction commands are calculated by the control system. As the truck drives and steers, the speed and rotational direction of the wheels are controlled independently, allowing the truck to negotiate tight turns with no tyre wear.

The 4t capacity all-wheel drive Combi-CBE4 is a finalist in the Special Vehicle Category
(Picture: Combilift)

The Combi-CS has been nominated in the Warehouse Truck Lowlifter Category. It is the only pedestrian counterbalance stacker that will operate in a conventional reach truck aisle for space saving and productive storage and handling. It features Combilift's unique, internationally patented and award winning multi-position tiller arm which can be turned to the left or right of the unit to position the rear drive wheel, allowing the operator to remain at the side of the machine rather than at the rear as is the case with other pedestrian stackers. This ensures optimum visibility of the load and surroundings as well as guaranteeing maximum safety in areas where other personnel or members of the public may be present.

The competition will enter its next round when finalists undergo the IFOY audit and innovation check by industry experts in mid-February in Hanover, Germany. 27 journalists from leading logistics media from 19 countries will also personally test and evaluate the nominated equipment for qualities such as technology, design, ergonomics, safety, marketability, customer benefit and sustainability.

"Following the nomination of the Combi-PPT powered pallet truck last year, we are delighted that the IFOY committee has recognised two of our innovative products as being worthy of finalist status in 2020," said Combilift CEO and Co-founder Martin McVicar.

Combilift, Ireland

Steel logistics

SSAB's road transportation digitalized through eTransport

Digitalization is part of logistics today. Innovative technology makes it possible to track and plan shipments more efficiently. Client requirements for transport chain visibility and traceability are also recognized by SSAB. The first step in digitalization of the transport chain is to adopt electronic data interchange. Digitalizing information makes it more adaptable for numerous applications as digital services are developed.

SSAB has systematically been developing electronic data interchange for years in road transportation. In 2013, SSAB sites in Finland adopted electronic data interchange with transport operators. The concept was named eTransport. Today, the same system is used for transport orders and monitoring in Finland and Sweden. eTransport is used at all SSAB sites and service centers in Finland, as well as the Borlänge, Oxelösund and Finspång sites in Sweden.

eTransport has become increasingly popular over the years, and currently around 60 transport operators are using the solution. SSAB's sites use the system for placing orders electronically with transport operators. The operator confirms the order electronically and submits any additional data required by the site, including vehicle registration numbers and pick-up times. Once the transport operator picks up the shipment from our site, the pick-up time is logged into eTransport. When the shipment arrives, the transport operator logs the actual delivery time into the system. The operator can also report any inconsistencies or other events affecting the shipment during transportation with eTransport.

"Technically speaking, eTransport is a combination of Electronic Data Interchange (EDI) and cloud services. Everything revolves around transport-related data, which is exchanged through a harmonized data transfer interface. Standardized data and technical solutions have facilitated connecting new operators to eTransport. Both SSAB and the transport operators have access to the same view and data content," explains SSAB Europe's eTransport Project Manager Juha Harju-Panula.

"Once a transport operator has been connected to eTransport, they are able to communicate with all SSAB sites. The transport operator can choose to connect to eTransport with a mobile device, web browser, or by implementing an EDI connection in their own system", he continues.

> eTransport is a combination of Electronic Data Interchange (EDI) and cloud services. Once a transport operator has been connected to eTransport, they are able to communicate with all SSAB sites.
>
> *Juha Harju-Panula, eTransport Project Manager at SSAB Europe*

Benefits of eTransport

The eTransport concept improves cost-efficiency for road transportation through automated data processing. Electronic transport orders reduce manual labor and the risk of human errors. SSAB's sites are also able to schedule operator arrivals more accurately and prepare for upcoming loading processes in advance. This shortens unloading times, facilitating loading and ensuring that products are delivered to customers faster.

eTransport supports SSAB's delivery accuracy targets by improving transport chain transparency. Some road transport can already now be followed in real time, which enables information about in consistencies electronically from eTransport. In future, transport tracking information will be available to customers through the customer portal as well as through eTransport.

SSAB

eTransport is used for transport orders and monitoring at all SSAB sites and service centers in Finland, as well as the Borlänge, Oxelösund and Finspång sites in Sweden (Picture: SSAB Europe)

New steel warehouse has commenced operations

thyssenkrupp expands service offering in Poland and celebrates 25th anniversary

With around 13,500 square meters of storage space, the new warehouse in Nowe Marzy now complements the service hub in north Poland. Automation and digitalization significantly boost productivity.

thyssenkrupp Materials Poland, a company of the Materials Services business area (the distribution and service provider of the thyssenkrupp), has further expanded its regional warehouse in the north of the country. The new facility in Nowe Mazy, which recently went into operation, is already the second stage of expansion with around 13,500 square meters of storage space. In the first construction phase, a warehouse with around 17,500 square meters went into operation in 2017. Together with the other regional warehouses in Blonie, Dabrowa Gornicza and Poznan, Nowe Mazy now provides the company with a unique logistics network for supplying its customers throughout Poland at short notice. In addition, the company has 16 sales offices in almost all parts of the country. The product portfolio includes rolled steel, non-ferrous metals, quality steel, aluminum, plastics and stainless steel. In addition, the Polish company can look forward to a very special anniversary. For 25 years thyssenkrupp Materials Poland has been one of the leading materials and service companies in the industry.

> The increased demands of our partners are one of the reasons why we continue to expand our storage and processing capacities.
>
> *Ryszard Bojarski, Managing Director thyssenkrupp Materials Poland*

For 25 years thyssenkrupp Materials Poland has been one of the leading materials and service companies in the industry (Picture: thyssenkrupp)

"We are particularly pleased that we have been a reliable partner to our customers for over 25 years. The increased demands of our partners are also the reason why we continue to expand our storage and processing capacities. This enables us to ensure that our customers can concentrate fully on their core business," says Ryszard Bojarski, Managing Director in Poland.

Materials Services in Eastern Europe

Materials distribution is one of the leading materials and processing specialists in Eastern Europe. With companies in Poland, the Czech Republic, Hungary, Slovakia, Romania, Serbia, Bulgaria and Turkey and sales offices in Croatia and Lithuania, thyssenkrupp has an almost unique materials trading network in the region.

The product portfolio includes rolled and stainless steel, nonferrous metals, plastics and pipes. Furthermore, the company offers customized services such as slitting and cut-to-length, laser and plasma cutting and sophisticated surface treatments for all products. The range of services is rounded off by just-in-time deliveries, customer consulting and individual supply chain services. A total of almost 2,000 employees work in 46 locations to meet the needs and requirements of customers.

thyssenkrupp Materials Services

Aperam to modernize service desk for end users

HCL Technologies will transform the end-user experience and IT operations for Aperam through best-in-class services based on artificial Intelligence and automation.

HCL Technologies has secured a contract with Aperam, a global player in stainless, electrical and specialty steel to significantly enhance its employees' end-user experience, foster business-IT collaboration, and increase business efficiency globally. HCL Technologies will be providing a 24x7 multi-channel multilingual IT service desk for Aperam's end users, using its AI-enabled cognitive virtual assistant, DRYiCE™ Lucy, to provide first-line support. Increased automation and the use of predictive analytics will significantly reduce resolution times and help transform Aperam into a true next-generation digital workplace. In order to ensure that Aperam is realizing full value from all its IT suppliers, HCL will also be establishing an end-to-end service integration framework. Through AI and automation capabilities, and a service integration framework, Aperam will be able to be supported by innovative end users' chatbot to transform its IT operations.

HCL Technologies

ArcelorMittal expands e-commerce in Europe

First launched in France in 2017, ArcelorMittal e-steel is now available in Belgium, the Netherlands and Italy and in five languages. And its deployment is still ongoing in 2020, with Spain and Germany added to the list.

Fluid and intuitive, the e-shop "ArcelorMittal e-steel" has been designed to simplify customer shopping experience. With this new service, customers can easily find products, such as beams, sheets, tubes and bars and order them in a few clicks. B-to-B and B-to-C customers can see the real-time stock status of the products, add them to their cart, choose their delivery method, and then safely pay their order online. Once registered/logged in, customers can see their own condition prices, check their order history, re-order products, access their promotional discounts, add products to their favorites and contact their sales representative.

ArcelorMittal

Benteler divests distribution business to focus on automotive

Benteler has taken the strategic decision to increase its focus more on its core automotive business and sell the Benteler Distribution division to Van Leeuwen Pipe and Tube Group.

Digitalization, new technologies and changes in production methods in the automotive industry have provided Benteler with new opportunities. This requires an active focus on its core business, the automotive division, which accounts for approximately 80% of the group's turnover, combined with substantial investments.

Against this backdrop, Benteler has decided to divest its distribution division to the Van Leeuwen Pipe and Tube Group. The sale is expected to be completed by the end of 2019. Benteler Distribution is an international distribution partner for high-quality steel tubes and associated services with around 1,600 employees.

Benteler

XOM Materials signs 50th distributor

XOM Materials, the independent industry platform launched by Klöckner & Co, has brought its 50th distributor on board.

The platform has further extended its range to include around 20,000 different products and also offers plastic products to its registered customers, who number around 600 in all. In addition, the XOM Materials platform will be complemented by e-shops and e-procurement solutions in the future. XOM Materials is expanding not only its product portfolio but also its international footprint, having signed ten distributors onto the platform in Spain alone.

In signing its 50th distributor, XOM Materials has reached a major milestone in its still short history. XOM Materials was founded in Berlin in 2017 with the aim of creating a procurement platform for all the products and services associated with the materials industry. March 2018 marked the official market launch of the XOM Materials platform. This was followed by the opening of two additional offices: Parts of sales are based in Duisburg, Germany, and the facility in Atlanta, Georgia handles activities on the US market.

Klöckner & Co

40 years of Messe Düsseldorf representation in Moscow

Exposcentre Moscow, the fair ground of Messe Düsseldorf Moscow (Picture: Messe Düsseldorf)

On 15 October 1979, Messe Düsseldorf opened its official representation in Moscow. Today, the Moscow subsidiary accounts for 44% Messe Düsseldorf Group's abroad sales.

Messe Düsseldorf Moscow today employs 49 members of staff and organizes 14 trade fairs and trade fair participations in Moscow, Novokuznetsk, Kazan, Ufa and Yekaterinburg.

As early as in 1963, Messe Düsseldorf ventured behind the Iron Curtain opening up a new market for its customers. "It was adventurous, to say the least, to organize trade fairs in the then Soviet Union," remembers Werner M. Dornscheidt, president and CEO of Messe Düsseldorf. Messe Düsseldorf is an active and acknowledged member of the Russian exhibition industry. In 2010 Messe Düsseldorf Moscow was the first foreign company to become a member of the Russian Union of Exhibitions and Fairs. In 2018 membership as the first foreign member in the Convention Bureau Russia followed.

Thomas Stenzel, Managing Director of Messe Düsseldorf Moscow, stresses the importance of the company as a mediator between the two countries: "We pave the way to the Russian market for Germany companies, create a local platform for the Russian economy and accompany companies from Russia to Messe Düsseldorf events all over the world."

The longstanding activities of Messe Düsseldorf in Moscow also formed the basis for the town twinning between Düsseldorf and Moscow in 1992.

Messe Düsseldorf

NLMK begins commercial deliveries of high-strength steel for machine building

As part of its high-strength hot-rolled steel development programme, NLMK has started commercial deliveries from its Lipetsk site of S500MC and S550MC high-strength HRC (yield strength 500 and 550 MPa) to the Russian market.

These steel grades are 40% stronger than general-purpose hot-rolled products, and are used in heavy-duty structures and components, such as in dump truck bodies, scrap trucks, truck chassis, cranes and other special purpose machinery. The metal undergoes special thermomechanical treatment at NLMK's hot rolling mill to acquire its strength properties. High-strength steel sheets come in the following dimensions: 4 mm to 8 mm thick, up to 1,500 mm wide, and up to 12 meters long. Customers can order in small batches of up to 20 t with truck delivery. They also have the option of adding high-strength Quard© plates to their order, which NLMK supplies to Russia from its NLMK Clabecq plant in Belgium.

NLMK

TimkenSteel to close material services facility in Houston

TimkenSteel Corporation is going to close its TimkenSteel Material Services facility in Houston, Texas, in the first quarter of 2020.

As a result of the plant closure, TimkenSteel expects to realize approximately US$ 6 million to US$ 8 million of annual savings. "We are focusing on our core strengths of making and heat treating steel, and more fully utilizing our supply chain to provide the value-added services required by our customers. This change to how we serve the evolving energy market will improve the company's financial performance," said William Bryan, executive vice president of manufacturing and supply chain. The operation currently employs approximately 100 people who provide precision value-added and finishing services, primarily to customers that service the energy market.

TimkenSteel

Dalmia OCL: TML Technik GmbH

6 pages, English
India-based Dalmia-OCL has a more than six decades history as refractory specialists. To the iron and steel industry the company supplies refractory products for the entire process chain from sinter, coke oven and blast furnace plants via hot metal transport, steelmaking in EAFs and BOFs via secondary steelmaking, purging plug and slide gate systems through to continuous casting equipment.

Dalmia-OCL, 4, Scindia House, Connaught Place, New Delhi 110001, India, fon: +91-11 23457-100, enquiries@DalmiaOCL.com

Küttner: Sustainable metallurgical solutions

20 pages, English, German
A detailed brochure outlining the activities of Küttner in the fields of iron & steel, foundry, non-ferrous metals and energy & environment. For iron and steel plants Küttner supplies systems for screening, mixing, breaking, agglomeration, grinding, injection, etc. Also exhaust gas cleaning, heat recovery and dedusting systems, and their process integration, are part of the extensive supply range.

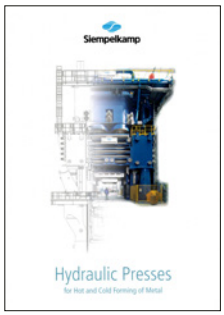
Küttner, Alfredstrasse 28, 45130 Essen, Germany, fon: +49 201 7293-0, info@kuettner.com

Renk: Intelligent coupling solutions

44 pages, English, German
Renk specializes in innovative coupling solutions for industries as diverse as steel and metals, railway, petrochemical, marine, material handling, wind energy and paper. The company's product range includes gear couplings, gear joints, gear spindles, safety couplings, maintenance-free couplings, flexible couplings and synchronous clutch couplings.

Renk AG, Rodder Damm 170, 48432 Rheine, Germany, fon: +49 5971 790-0, info.rheine@renk.biz

Siempelkamp: Hydraulic presses for hot and cold forming



64 pages, English, German, Russian, Chinese
An encompassing brochure detailing the wide scope of engineering expertise. Featured in great detail are the various presses supplied by the company: open and closed-die forging presses, isothermal forging presses and ring performing presses, also ring rolling mills and special presses.

Siempelkamp Maschinen- und Anlagenbau GmbH, Siempelkampstrasse 75, 47803 Krefeld, Germany, fon: +49 2151 92-30, composites@siempelkamp.com

TML: Special solutions for extreme conditions

32 pages, English, German, Russian
This brochure provides a comprehensive picture of the range of solutions developed by TML based on the company's Unidachs series of telescopic excavators launched more than 50 years ago. Küttner machines are used for cleaning runners in blast furnaces, skull cleaning, tap hole drilling and de-bricking in converters and EAFs, for slag pit clearing and ladle maintenance, etc.

TML Technik GmbH, Daimlerstrasse 14-16, 40789 Monheim am Rhein, Germany, fon: +49 2173 9575-100, info@tml-technik.com

Vollmer: Process optimisation in the rolling mill

20 pages, English, German
This brochure sets out the Vollmer range of precision measurement, control technology for the rolling process. Vollmer supplies systems for online strip thickness, shape and width measurement, offline cross-profile measurement and the measurement of rolls and also provides modernization, engineering, maintenance and automation services.

Friedrich Vollmer Feinmessgerätebau GmbH, Verbandsstr. 60 b, 58093 Hagen, Germany, fon: +49 2334 507-0, contact@vollmergmbh.de

Conferences and symposia

Aachener Stahlkolloquium – ASK 2020	26 – 27 March 2020 Aachen, Germany	RWTH Aachen www.ASK2020.de
World DRI and Pellet Congress	15 – 16 April 2020 Dubai, UAE	Fastmarkets MB Events t1p.de/fs43
Eurocoke 2020	27 – 29 April 2020 Amsterdam, NL	Smithers www.metcokemarkets.com
AISTech 2020 Conference	4 – 7 May 2020 Cleveland, OH/USA	Association for Iron & Steel Technology www.aistech.org
SEAISI 2020	8 – 10 June 2020 Kuala Lumpur, Malaysia	South East Asia Iron & Steel Institute www.seaisi.org
SCT 2020 – Steels in Cars and Trucks	14 – 18 June 2020 Milan, Italy	TEMA Technologie Marketing AG www.sct-2020.com

Exhibitions, trade fairs

CONAC 2020	23 – 25 March 2020 Monterrey, Mexico	AIST Chapter Mexico https://conac.mx/en/
Tube & wire 2020	30 March – 3 April 2020 Düsseldorf, Germany	Messe Düsseldorf www.tube.de – www.wire.de
AISTech 2020 Exhibition	4 – 7 May 2020 Cleveland, OH/USA	Association for Iron & Steel Technology www.aistech.org
Metal + Metallurgy China	13 – 16 May 2020 Shanghai, China	CIEC Exhibition Co., Ltd., CIEC Group Corp. www.mm-china.com
Metallurgy – Litmash Russia	9 – 11 June 2020 Moscow, Russia	Messe Düsseldorf www.metallurgy-russia.com

Seminars

Electrical engineering of arc furnaces	9 – 11 March 2020, Cologne, Germany	Steel Academy of Steel Institute VDEh www.stahl-akademie.de
Cokemaking	20 – 23 April 2020, Duisburg, Germany	Steel Academy of Steel Institute VDEh www.stahl-akademie.de
Refractory technology	26 – 29 April 2020, Cologne, Germany	Steel Academy of Steel Institute VDEh www.stahl-akademie.de
Hydrogen-based reduction of iron ore	4 – 5 May 2020, Cologne, Germany	Steel Academy of Steel Institute VDEh www.stahl-akademie.de

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Preview of the April 2020 issue

Steel technology

Thermomechanical rolling: a new perspective in reinforcing steel production

Processes traditionally intended for quality steels, such as the thermomechanical rolling, have been adapted to the field of rebar steels to decrease production costs. After the new high-strength rebar standard was released in China in 2018, quenched and tempered rebars are no longer allowed. Two companies, Lianxin Steel and Shandong Laigang Yongfeng Steel Co, decided to introduce the TMbaR technology in their new rebar rolling mills, both designed for an annual production of 1,000,000 tons.

Strip processing

State-of-the-art blanking line combines advanced cut-to-length shear and innovative stacking unit

A truck manufacturer has produced blanks for cabs on a Schuler line for almost a year now. The high-tech cut-to-length shear produces blanks from a coil. As one of the first Schuler systems, the line not only features the new uniform visualization, but also an innovative concept for stacking the blanks.

Steel markets

Global 3D printing metals market advancements

The global 3D printing metals market size is expected to reach USD 3.05 billion by 2025, according to a new market report, progressing at a CAGR of 31.8% during the forecast period. Increasing adoption of 3D printing as a mainstream manufacturing method and rising investments in research & development (R&D) of 3D metal printing are anticipated to fuel product demand. Use of 3D metal printing is prominent in the aerospace & defence industry owing to rapid prototyping and manufacturing speed offered by 3D printing.

Advertisers' index

HÜTTENTAG

GET-TOGETHER OF THE STEEL INDUSTRY

PRESERVING TRADITION, SHAPEING THE FUTURE!

Thursday, **5 November 2020**

Credo: **Preserving tradition, shaping the future!**

Lecture programme with company exhibition

09:00 starting lecture programme and company exhibition
18:00 **"Hüttenabend"** get-Together and networking

Venue: **Messe Essen**
Messeplatz 1 | 45131 Essen, Germany

Information on our homepage:
www.homeofsteel.de/huettentag

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