High-tech – Made by SMS

Paul Wurth – Core competence in BF technology
Ten years of success with PQF®
Wherever a blast furnace is built today, Paul Wurth is very likely to be involved in the project as a supplier. For almost 60 years, the Luxembourg-based company has built blast furnaces virtually everywhere in the world. On December 17, 2012, the takeover of the majority share of 59.1 percent in Paul Wurth by SMS Holding GmbH was finalized. The product ranges of Paul Wurth and the SMS group are perfectly complementary.

The 2.6-m heavy-plate mill installed at the Slovenian steelmaker Acroni in Jesenice could commence production much faster than expected. During a downtime, SMS Innse, a company of the SMS group, modernized the mill within a period of merely 34 days.

SMS Meer has more than 125 years experience in producing seamless tubes. Its roots go back to the year 1885, when the brothers Reinhard and Max Mannesmann received their first patent for the production of seamless tubes. Together with Mannesmann, SMS Meer developed the first piercing and pilger mills.
The SMS group invests worldwide in the modernization and expansion of manufacturing capacities. This is done with the objective to further increase customer satisfaction through shorter lead times and higher productivity. To be able to offer customers technologically and economically outstanding plant and mechanical engineering concepts, the SMS group has been pursuing a twin strategy.
Irving Rossi admitted to “Hall of Fame”
“American Metal Market” honors Concast founder

The continuous casting technology revolutionized the steel industry in the middle of the 20th century. The process enabled a higher productivity to be achieved than ever before. Irving Rossi, founder of the Swiss company Concast, launched the technology on the market. For his achievements, he has now been awarded a place in the “Hall of Fame” of the American trade journal American Metal Market. “Thanks to Rossi, the American steel industry was able to develop to become one of the most productive in the world,” they explained.

In the past century, Rossi was considered an astute businessman with a good instinct for technical innovations. 235 patents were registered in his name, some of which did not develop their potential until decades later.

To this day, Rossi is mainly known for his contribution to continuous casting. He made history as the “Father of commercial continuous casting and mini steelworks”. In May 1949, Rossi transferred the casting process from non-ferrous metals to steel for the first time. This required a great deal of courage and perseverance.

For the first production plants in the U.S.A., the entrepreneur guaranteed the steel quantity and quality, and the investments turned out to be profitable. The process enabled the American steel industry to achieve an immense boost in productivity and ensured its success for many years.

With the stationary process used until then, casting took one to two days, as it had to pass through twelve different stations. Rossi’s continuous casting process, on the other hand, comprised only five stations and took just one hour to complete – with a material yield of over 90 percent. Rossi took his know-how to Europe and in 1954 founded Concast in Zurich together with the later managing director, Dr. Heinrich Tanner.

A pioneer in continuous casting technology in the western world – the Soviet Union had already developed continuous casters earlier – Concast was for a time the only supplier of plants of this kind.

In 1961, at the age of 72, Rossi sold the company. Under the management of Dr. Heinrich Tanner, the success story continued. In the 1970s, the market share in the field of continuous casters was as high as 60 percent, before reservations on the part of the antitrust authorities necessitated a splitting of the business.

From 1981, SMS, Clecim (France) and Distington/British Steel (United Kingdom) concentrated on the construction of plants for slabs and heavy plate. Concast Standard AG, founded in the same year, focused on the construction of casters for the production of billets (long products).

In 1996, Concast acquired ABB’s electric arc furnace division and the business was expanded to include electric arc furnaces and secondary metallurgical plant later on.

In 2004, SMS took over 100 percent of the Concast shares. The company became the successful full liner for steel plants and continuous casters for long products.

Rossi died in 1990 at the age of 101. In this year, 455.17 million tons of steel were cast continuously, corresponding to 59.15 percent of the world steel production – a share that without Irving Rossi could never have been achieved.

www.sms-concast.com
With effect from January 1, 2013, Stefan Leser has been the new President of SMS Siemag China. Leser, who graduated in mechanical engineering, has many years of experience in this field as well as in plant engineering and in energy and power plant technology. His most recent assignment was that of Managing Director at Bilfinger Berger Power in South Africa. From 2005 through 2009, Stefan Leser was in charge of Technology and Sales in the Environmental Technology BU of Balcke Dürr GmbH in Wuxi/Shanghai, China.

Since January 1, 2013, Marc Hoffmann has been Vice President of the Strip Processing Lines Division. The Division covers virtually the complete range of strip finishing and processing lines. Most recently, he worked for over five years as Assistant to the Chairman of the SMS group. Prior to this, he had joined the Corporate Development Department of SMS Siemag AG. He is aged 33 and holds a degree in business administration.

Marc Solvi, CEO of Paul Wurth S.A., Luxembourg, has been appointed to the Managing Board of SMS Siemag AG with effect from January 1, 2013. The takeover of the majority share of 59.1 percent in Paul Wurth by SMS Holding GmbH was finalized on December 17, 2012. Marc Solvi will continue to be in charge of the management of Paul Wurth. Furthermore, he will work with Dr. Guido Kleinschmidt, Member of the Managing Board of SMS Siemag AG, to coordinate the cooperation between Paul Wurth and SMS Siemag.

With effect from April 1, 2013, Norbert Theelen has been appointed Deputy Member of the Managing Board of the SMS Meer Business Area and Technical Director of the Tube Plants Division. The 55 year old has worked in the company since 1973. His market and product knowledge as well as his many years of experience in mechanical and plant engineering will contribute to further expanding the innovative strength of the Business Area and drive ahead business development.
Tata Steel honors SMS Siemag as “Best Vendor”

On February 28, 2013, Tata Steel honored SMS Siemag as best vendor in recognition of its performance in the fields of servicing, repairs and maintenance during the year 2012. The certificate was handed over in the course of an evening event in Jamshedpur.

Tata Steel justified its decision by stating that SMS Siemag had been a reliable partner over many years. SMS Siemag is the main supplier of the new CSP® line and the new LD converter 3. Last year, both companies signed a five-year framework contract to improve and facilitate the sourcing of spares. Looking towards the future, this contract safeguards the Indian customer’s plans as SMS Siemag keeps the spare parts ready. A further nominated company for the category of Best Vendor 2012, apart from SMS Siemag, was SMS Concast.

Tata Steel belongs to the Tata Group, India’s largest industrial group which produces more than 28 million tons of steel per year.

SMS Meer acquires Girard Associates Inc.

SMS Meer, Germany, has acquired the US-engineering firm Girard Associates, Strongsville, Ohio. “For over 50 years Girard has been our partner in the American market and we are happy to welcome them today into the SMS family,” says Dr. Joachim Schönbeck, President and CEO of SMS Meer. “Together with Girard we will be able to offer even better solutions to our customers in North America.”

Robert Bolin will remain President and CEO of Girard. “We are honored and excited to become part of a leading company like SMS Meer and we are looking forward to taking our firm to the next level with the support of SMS,” says Bolin. “We fully expect to improve and expand our ability to engineer, service and support our customer base.” Girard Associates is an engineering firm which has been specializing in controls, hydraulics and robotic systems in the North American forging industry for more than 60 years.
The SMS Siemag TECademy is the international seminar and training academy for the worldwide metallurgical and rolling mill industry. It offers steelmakers and rolling mill owners efficient further training packages based on the expert know-how of SMS Siemag. Engineers, plant technicians, plant owners and other specialists will find here expert support helping them recognize the potential of their plants and utilize it efficiently.

There is a variety of modules relating to the fields of technology, plant engineering as well as servicing and maintenance available to all interested parties to choose from. Furthermore, the SMS Siemag TECademy offers individually tailored modules upon request, which can be conducted either at SMS Siemag in Hilchenbach and Düsseldorf, the international SMS Siemag subsidiaries or directly at the customer’s premises.

Extract from the 2013 program

Technology

- Webucation: Metallurgical process chain  
  (German and English) Offered all year round; runs for six months after activation
- Webucation: Hot strip and heavy-plate production Module 1: Fundamentals and plant engineering (German and English)  
  Offered all year round; runs for six months after activation
- Basic training seminar on steel production  
  September 17 to 18, 2013 (English)
- Expert training for hot-rolled aluminum strip  
  October 8 to 10, 2013 (English)
- Practical training day, hot rolling  
  July 17, 2013 (German), November 26, 2013 (English)
- Materials technology  
  September 26 to 27, 2013 (English)

Servicing and maintenance

- Morgoil®/Basic training for oil-film bearings  
  November 14 to 15, 2013 (English)
- SMS Siemag hydraulics systems – intensive course  
  April 15 to 19, 2013 (German), December 2 to 6, 2013 (English)

Plant engineering

- Basic training  
  Flatness measurement in flat-product rolling mills  
  April 23, 2013 (German), December 10, 2013 (English)
- Fundamentals  
  ProBAS technological control system  
  April 8 to 12, 2013 (German), November 25 to 29, 2013 (English)
- Advanced training course  
  ProBAS technological control systems  
  April 24 to 26, 2013 (German), December 11 to 13, 2013 (English)
- Maintenance  
  ProBAS technological control systems  
  July 16 to 18, 2013 (German), December 17 to 19, 2013 (English)

Contact: tecademy@sms-siemag.com  
Internet: http://tecademy.sms-siemag.com
SMS group invests worldwide in the modernization and expansion of manufacturing capacities

The objective is to further increase customer satisfaction through shorter lead times and higher productivity. To be able to offer customers technologically and economically outstanding plant and mechanical engineering concepts, the SMS group has been pursuing a twin strategy. On the one hand, constant investments have been made to expand and modernize the German manufacturing locations in Hilchenbach and Mönchengladbach. There, the very sophisticated and hence quality-critical core components of the plants and machines are developed and manufactured.
On the other hand, the SMS group is further expanding its presence in key markets, such as China and India, by building manufacturing and service facilities and hiring qualified personnel. In this way, the group can guarantee that the local supply and service shares, which are being increasingly demanded by the customers in those markets, will be of the usual SMS quality. After opening an SMS Meer workshop in Shanghai in 2010, SMS Siemag inaugurated a newly erected workshop in the Chinese city of Zhangjiagang in 2012.

Success factor: Highly qualified personnel

Along with these projects, well over 1,000 employees have received training. Additionally, SMS Siemag invested in a new training workshop in Hilchenbach.

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Groundbreaking for the modernization of the production facilities at SMS Siemag in Hilchenbach took place in 2008. “With these measures, we have given once more a boost to the competitiveness of our manufacturing processes at that location,” says Dr. Wolfgang Weis.

SMS Siemag invested in the construction of new buildings and workshops covering a floor area of over 10,000 square meters. Facilities for welding and tube production, a painting shop, a warehouse and manufacturing shops for gears and hydraulic equipment were newly established. Moreover, various new machine tools were purchased. Building of the last hall will be completed in 2013: a modern dispatch and surface finishing center. “Through the new dispatch area, the space available for workshop assembly activities has been significantly expanded,” explains Production Manager Weis.

However, in plant engineering it is not sufficient to just purchase new machinery and build modern workshops. At least not if you design and build high-tech equipment, as the companies of the SMS group do. “We analyzed our production processes and implemented major changes in certain areas,” says Weis. Both SMS Siemag and SMS Meer established new manufacturing cells, which have markedly cut the manufacturing cycles for certain components.

The new horizontal turning and milling center from Weingärtner, which is used in Hilchenbach for machining coiler parts, is only one of many examples of cellular manufacturing that creates obvious
added value for the customer. This machine combines the formerly separate processes of turning, milling and gear cutting in one unit. Machining of a coiler mandrel can now be accomplished in fewer process steps. “As a result, the cycle time has been reduced by more than 40 percent – to the benefit of our customers,” emphasizes Weis. The unit is located in the machining shop, which can now handle workpieces of up to 130 tons weight.

Also SMS Meer invested in a comparable and even newer machine from Weingärtner. Since 2012, a five-axes machining unit for combined turning and milling has been in operation in Mönchengladbach. It is no longer necessary to switch between two machines. This saves time and money. “On top of that, the maintenance effort is reduced by 20 percent,” adds Heinz-Joachim Gietmann, Manager Production at SMS Meer.

The new manufacturing cells in Hilchenbach and Mönchengladbach improve the synchronization of processes. Long transport and waiting times are prevented. At the same time, the parts to be processed are controlled according to the pull principle, i.e. only those parts needed for the next downstream process step are made available and machined.

At Hilchenbach, SMS Siemag also renewed the manufacturing facilities for hydraulic equipment. Whereas the facilities used to be distributed over several bays, they are now concentrated in one work-

shop. Here the work flow is now characterized by a streamlined process flow from the input material through to product shipment and by the concentration of all assembly and testing activities in one workshop. “This is modern production, as we know it from the automotive industry,” comments Weis.

For enhanced quality assurance, SMS Siemag built a new test field for testing and presetting hydraulic controls. “This markedly cuts the commissioning phase at the customer’s site,” adds Weis. “Here, we also make and test parts for SMS Meer.” This is an example of how closely the two Business Areas work together. “We maintain regular dialog and carry out joint projects,” says production expert Gietmann from SMS Meer.

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A great value added provided by these two German manufacturing locations is the close link between development, design and manufacture.

This creates synergies that many competitors lack. “Our plant designers or developers can simply go “next door” to talk to their colleagues in the manufacturing shop to discuss whether a new idea would be practicable at all,” explains Weis. This guarantees that the customers receive plants that are innovative and mature at the same time. While SMS Siemag will have completed its modernization activities in Hilchenbach by the end of the year, in Mönchengladbach there will be more major expansion activities to come. The new heavy-duty workshop 1A, with a floor area of 4,000 square meters, was already inaugurated in 2012.

“With the new workshop and the new machines, we are responding to the growing requirements of our customers who, for example, want to produce ever larger parts on our plants,” says Gietmann. But the workshop is only a part of the investment. “We will be replacing about 75 percent of our machine pool. With the new machines, we will be able to manufacture also complex parts of up to 200 tons in weight more economically in the future,” adds Gietmann. “And we also make key components for our spare parts service.” This project will be completed in 2015.
However, SMS Meer and SMS Siemag invest money not only in machinery but above all in the training and further education of qualified personnel. At SMS Meer, the complete manufacturing staff of some 300 received and are still receiving training as part of the modernization activities in the production facilities. This is almost 100 percent of the production staff. In addition to technical subjects, “change processes” are being thoroughly dealt with. “We involve all employees in the implementation of the changes to come,” explains Gietmann. In Hilchenbach, some 800 technicians and engineers were trained this way. “Our employees are crucial to the quality of our products,” agree Gietmann and Weis. For example in 2010, SMS Siemag built a new training workshop for apprentices in Hilchenbach. This is a guarantee for qualified junior staff, to the benefit of the customers. Every year, about 80 young people start an apprenticeship here in this workshop alone. At SMS Meer, the training department was completely repositioned. For example, a new turning and milling center is being set up in the training workshop to familiarize the young trainees with the latest machining technologies.

Nevertheless, SMS does not only rely on its domestic locations. The quality-critical core products – especially for new equipment – are made in Mönchengladbach and Hilchenbach. Standard parts, on the other hand, are manufactured in workshops outside Germany.

For this purpose, SMS Meer opened a new workshop in Shanghai in 2010 and SMS Siemag in Zhangjiagang in 2012. “Through this, our group can guarantee that the local supply and service shares, which are being increasingly demanded by our customers, have the usual high quality standards of SMS,” says Burkhard Dahmen, President and CEO of SMS Siemag.

The high SMS quality standards are guaranteed thanks to the close connection of all manufacturing facilities spread throughout the world. “We maintain regular dialog with all locations and carry out joint training activities for their staffs,” says Gietmann. “At the manufacturing facilities in Shanghai, German manufacturing specialists work side by side with persons assigned from Germany to take charge of the supplier management. For example, we lent the workshop in Shanghai a foreman from the SMS Meer workshop in Mönchengladbach for one year to support the activities there.” Also the workshop manager assigned to the SMS Siemag workshop in China for three years is a foreman from Hilchenbach.

With their investments in worldwide manufacturing capacities, SMS Meer and SMS Siemag are further consolidating their position as a leading supplier of plant and machinery for the production and processing of steel and NF metals, guaranteeing high-tech “Made by SMS”.

The SMS Meer workshop in Shanghai is to be further expanded.

In 2012, SMS Siemag opened a workshop in Zhangjiagang, China.
Russia is on the move. The nation’s accession to the WTO is changing the framework conditions, while also providing new opportunities for companies such as the SMS group, according to Jens Barth, Member of the Managing Board at SMS Meer. Barth looks back on 20 years of experience in Russia and for a long time he was in charge of the Moscow office of the SMS group.

In the Russian steel industry more than 1,500 companies with approx. 670,000 employees generate roughly ten percent of the national industrial production. About 60 percent of the steel is produced by companies which play an important role for the respective region in which they are located. In the past, entire cities have been built around steel-producing plants which resulted in a high degree of cluster formation and the great importance of the steel industry for local economic policy.

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In 2010, SMS Meer supplied a large-diameter pipe mill to the Russian ChTPZ Group.
MARKETS AND REGIONS

Jens Barth: “It is for example not unusual that large steel producers in Russia have their own coal mines.” However, the industry is still facing an enormous investment backlog: until the Putin era there were almost no investments in new equipment for about 15 to 20 years.

Due to long distances and high tariffs for energy and transportation, the production costs in Russia are comparatively high. In the past, the export ratio fluctuated between 40 and 60 percent. Owing to the WTO accession, quality requirements are increasing which poses additional challenges for Russian steel producers.

At present, Russia is exporting around four times the amount of steel products (approx. 30 million tons, without tubes and pipes) than it is importing (approx. 7.2 million tons). In 2011, Iran (17 percent), Italy (14 percent) and Turkey (8 percent) have been the main customers of the Russian steel production.

Consequences of WTO accession

The Russian accession to the WTO facilitates the export to third countries. Due to the adjustment of the tariff rates and the technical standardization, the market opportunities for plant construction and mechanical engineering companies abroad are certainly also rising, e.g. for companies such as the SMS group. It is planned to accept CE certificates in Russia, which has not previously been the case. Customs duties for metal products decreased from 14.9 percent to eight percent and for some products even to five percent.

Since Russia’s membership of the WTO will mean the financial and insurance sector will also be opened up and that an adaptation of the legal system to the standards of the World Trade Association can be expected, the investment climate for foreign companies should improve considerably. In addition, the WTO principle of national treatment obligation should also ensure in the medium term that tenders for domestic and foreign companies are implemented by the same rules and that markets open up which have been sealed off until now. “In the end, Russia itself benefits through WTO accession from a higher image as part of the world trade community. Moreover, the reinforced presence of foreign goods should have a positive effect on quality and competitiveness of Russian products in the long term,” Barth added.
“German enterprises do not need to fear Russia,” said Jens Barth, Member of the Managing Board of SMS Meer GmbH. “Steel exports to the EU so far are fairly low at 2.5 million tons and are additionally regulated by quotas.”

Due to its WTO accession, Russia can stabilize as a reliable supplier of simple steels in particular, alongside Turkey and the Ukraine. For German and European vendors this would in return result in new opportunities in Russia in the quality steel area. German machinery and plant manufacturing companies also benefit from it.

Russia’s entry to the WTO will force Russian steel producers to improve the quality of their products. For this, they need high-tech equipment and for many years now Russian companies have relied on the companies of the SMS group. For example, a heavy-plate mill from SMS Siemag was put into operation at Vyksa Steel at the end of 2011. Heavy plates are then further processed on a tube welding plant from SMS Meer into to large-diameter pipes for transporting oil and natural gas.

References:
- Large-diameter pipe mill ChTPZ Group, SMS Meer, 2010
- Heavy plate mill Vyksa Steel, SMS Siemag, 2011
- Secondary metallurgy center OMZ/Forpost Management, SMS Mevac, 2011
- Color coating line Severstal, SMS Siemag, 2011
- Continuous caster MMK, SMS Siemag, 2012
- Universal mill Novokuznetsk, SMS Meer, 2012
- Inductive bar heating plant Promco, SMS Elotherm, 2013

Turnover: SMS group in Russia 178 million euros (2012)
Employees: 137 (without SMS-CHELTEC LLC, 2012)

The ChTPZ Group produces large-diameter pipes for the oil and natural gas industry.
Steel market, China

SMS group – reliable partner of the Chinese steel industry

Currently, almost every second ton of crude steel is produced in China. The country has been constantly investing in new plant and equipment to make steel products. In this process, the companies of the SMS group have been important partners. They have been supplying plants to China for more than 100 years. The know-how of their engineers and the high quality of their plants are greatly valued, as numerous references demonstrate.

Although the economic growth in China has slowed down recently, in 2012 it still reached an impressive growth rate of between seven and eight percent, figures no longer attainable in Europe. Prosperity in the country, especially in the metropolitan areas, has been on a constant rise. For example, the automobile has become an important status symbol. Especially in the cities, premium brands are in great demand. In cities like Beijing and Shanghai, the government has set a limit on the number of new registrations to prevent the traffic from collapsing. According to the Association of the German Automotive Industry (VDA), 2012 was the first year in history in which more vehicles were sold in China than in Europe. It is forecast that by 2017 the production will have doubled.

Massive investment has also been made in infrastructure development. Since the end of 2012, China has boasted the world’s longest high-speed railroad line (2,300 kilometers) connecting Beijing and
Guangzhou. This takes the total length of the high-speed railroad network in the Middle Kingdom to around 9,300 kilometers. Its growth is going to continue: it is anticipated to be expanded to 50,000 kilometers by 2020 with a multi-billion investment. Also the construction industry has been continuously growing at double-digit rates. The world’s largest airport is under construction in Beijing. By 2015, several dozens of new airports are planned to be build countrywide. For all these projects, the country needs steel and the necessary capacities to produce the steel.

And technology from SMS is involved basically everywhere. For example at Handan Iron and Steel, section mills from SMS Meer produce the rails for the high-speed railroad tracks. The steel for new power plant projects is produced in electric arc furnaces and on continuous casters from SMS Siemag. Be it new installations or modernizations – SMS provides Chinese steel producers solutions from a single source. “For many years, we have been one of the most important system suppliers and technology partners for metallurgical plant and mechanical engineering in China,” says Dieter Rosenthal, Member of the Managing Board of SMS Siemag.

Success of CSP® in China. SMS Siemag took an active part in China’s rise to becoming the world’s biggest steel producer. For example, the expansion of flat product capacities started in 1997 when SMS Siemag received an order for the supply of a total of three CSP® plants – one for Guangzhou Zhujiang Steel, one for Handan Iron & Steel and one for Baotou Iron & Steel. Today, a total of seven of worldwide 27 CSP® plants are in operation in China – a success story for SMS Siemag. CSP® provides customers the possibility of entering a market with a decent investment and clear cost advantages over integrated iron and steel works. Economically efficient operation is already feasible from a production lower than one million tons. Numerous innovations have been implemented in the Chinese CSP® plants.

Maanshan Iron & Steel was the first steelmaker to introduce semi-endless rolling, a process that provides the preconditions for operationally reliable production of ultra-thin hot strip. Jisco was the first plant with the automation system being optimized by SMS Siemag’s Plug & Work procedure prior to commissioning. And Wisco was the first installation with special high-pressure scalers arranged ahead of the CSP® furnaces to ensure attainment of the specified surface quality, above all when processing silicon steels.

A symposium organized by SMS Siemag in Beijing at the end of 2012 presented additional developments in the field of CSP®. These included measures to dramatically reduce energy consumption by both new and existing CSP® plants. "Moreover, our plants can cover a very wide product range. Our latest developments make CSP® extremely flexible so that the plants can be swiftly adapted to changing market requirements," says Rosenthal. Expanded concepts, which SMS Siemag has combined under the name CSP® flex, enlarge the range of products, increase the flexibility and boost the capacity of CSP® plants. Today, CSP® plants can cover the complete spectrum from ultra-thin strips through to 19-mm-thick strip made of high-strength API grades.

As a plant supplier with longstanding experience – not only in the field of CSP® technology – the SMS group will continue to be an important and reliable partner for the Chinese steel industry in the future and contribute to the country’s growth and prosperity.

From May 29 to 31, 2013, a symposium on furnace technology will take place in Beijing giving steel producers the chance to appreciate the quality of SMS plants.
Steel market, India

Growth thanks to high-tech plants

Since 2005, the Indian economy has grown on average by more than eight percent annually. The country has been investing heavily in its infrastructure. Railway and road networks have been massively expanded and about one third of all investments is spent on projects in the energy production sector. For all this, the subcontinent is in constant need of steel. A future market for German plant and mechanical engineering companies like the SMS group.

In 2011, per-capita steel consumption in India amounted to 67.8 kilograms. This figure is reckoned to have doubled by 2020 due to growing urbanization and further development of the infrastructure. Indian steelworks can be anticipated to continue boosting their capacities. In 2011, 74 million tons of crude steel were produced in India. According to forecasts, Indian crude steel production is likely to reach 200 million tons by 2020. Tata Steel, which produced almost 24 million tons in 2011, is India’s biggest steel producer. Other steelmakers are also increasing their production.

The companies of the SMS group have been playing an important role in this process, as they have been active in the Indian subcontinent for several decades. This was reflected,
For example, in a symposium on steel plants and rolling mills organized by SMS Siemag in Gurgaon at the end of 2012. “For us, India is a key future market,” says Dieter Rosenthal, Member of the Managing Board of SMS Siemag. The first SMS office in India was opened in 1989. Today, some 900 people work for SMS Siemag in India, most of them at the main location in Gurgaon.

“We cover our complete product spectrum there, from metallurgical technology through to rolling mills and strip processing lines,” adds Rosenthal. The location in Kolkata is specialized in electrics and automation systems and, since 2012, the new workshop in Bhubaneswar in the state of Orissa has been active as a service provider. To date, SMS Siemag has implemented more than 200 projects in India. Among these projects were CSP® plants for Tata Steel and Bhushan Power & Steel.

Especially for India, CSP® has proved to be a suitable plant concept. Thanks to the lower transformation costs, a single-strand plant can be operated profitably from an annual production as low as 800,000 tons upwards. A CSP® plant can be flexibly adapted to a growing market demand by adding one or two casting strands. A three-strand CSP® plant provides an annual capacity of up to four million tons.

SMS Siemag and SMS Meer have been convincing Indian steel producers with their new plant concepts. This became clear at the SMS Siemag symposium, for example in the field of CSP® technology. The further development of CSP® will bring customers major savings on energy in the future. “An advantage that will also pay off in India,” explains Rosenthal. “Our customers will benefit in terms of lower operating costs, high quality and great flexibility of their plants.”

Also SMS Meer is active in the Indian subcontinent. SMS Meer India Pvt. Ltd. has an office in Kolkata. SMS Concast has an office with some 80 employees in Pune. SMS Elotherm established an office in Mumbai to be even closer to its customers. With plants from SMS Meer, India can push ahead with its infrastructure projects. For example, a new universal rail rolling mill supplied by SMS Meer is being installed at Bhilai Steel Plant, an Indian company of the SAIL Group. With this plant, Bhilai Steel Plant will be able to produce rails for high-speed trains. Other products will be rails for heavy-freight trains and products with hardened rail heads for special applications.

These references and developments demonstrate that SMS Siemag and SMS Meer will continue to be important partners for Indian steel producers. Because quality convinces.

CSP® plants in India
JSW Ispat (1998)
Bhushan Power & Steel (2003)
Essar Steel India (2011)
Tata Steel (2012)

“With our plants, we make a notable contribution to the growth of India’s economy and hence the country’s prosperity,” says Dieter Rosenthal, Member of the Managing Board of SMS Siemag.
Core competence – blast-furnace plant building
Following announcements in the summer of 2012, antitrust authorities have approved the purchase of Paul Wurth’s assets by the SMS group, making effective the entry of Paul Wurth S.A. into the SMS group. With headquarters in Luxembourg, Paul Wurth is a world leader in the engineering of ironmaking plants and facilities. Its technically advanced solutions provide an ideal complement to the existing SMS group product portfolio. With about 1,500 employees working in 26 entities worldwide, Paul Wurth is a market leader in the design and construction of complete blast furnace plants, coke-oven plants, and environmental facilities for the iron and steel industry. In addition, it has considerable expertise in the development of waste treatment and recycling facilities.

Wherever a blast furnace plant is built today, Paul Wurth is very likely to be involved in the project as a supplier. Almost 60 years ago, in 1954, Paul Wurth commissioned its first blast furnace in Seraing, Belgium. Since that time, the company has been involved in the design and supply of blast furnaces worldwide, with a current list of more than 220 project references.

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History

The company Paul Wurth dates back to 1870 when Eugène Muller founded a steam boiler factory in the Hollerich district of Luxembourg City. In 1890, Muller transferred ownership of the company to Paul Wurth, a young engineer who had been an employee of the company for several years. Under Paul Wurth’s guidance, the company was aligned to pursue rapidly growing opportunities in the Luxembourgish steel industry. Specialization emerged quickly in the engineering and construction of heavy steel structures, in particular bridges, cranes and blast furnace shells. The company increasingly felt at home in the iron and steel industry, leading to the acquisition of equipment licenses from Ashmore, Benson & Pease (United Kingdom) in 1951. These licences enabled the construction of new blast furnaces and all pertinent equipment in the town of Seraing, near Liège in Belgium in 1954. Here, the success story of a unique company started. Until the present day, it has been distinguishable for its competence in traditional ironmaking technologies and plant engineering know-how combined under one roof.

Innovative technologies for a traditional process

In ironmaking, the traditional blast furnace process underwent an impressive development during the 20th century. In the 1950s, the introduction of new materials, electro-mechanics, and electronic measurement and control equipment, along with computer technologies allowed the blast furnace size and effective yield to increase.

In 1969, a joint project between Edouard Legille and other Paul Wurth engineers resulted in the development of the Bell Less Top®, which turned out to be a revolutionary blast-furnace charging concept. The first implementation of this technology was in 1971 on blast furnace 4 of the August-Thyssen-Hütte in Duisburg-Hamborn, Germany (now ThyssenKrupp Steel Europe). The system enabled the
unprecedented ability to tightly seal a high-performance blast furnace while providing a highly flexible and controlled distribution of charging materials in the furnace shell. The true revolution, indeed, was the ability to control the blast furnace process “from the top”. This solution became so successful that it achieved a world-wide coverage of nearly 60 percent of the total market. Continuous improvement and new developments led to a variety of charging systems to suit all furnace sizes, operating conditions and budgets.

Today, the Bell Less Top represents a charging solution that comes with the most advanced equipment, measuring devices and mathematical models, and integrates a high level of process knowledge. With raw material costs and the demand for specific raw material qualities increasing, professional customer support and the flexibility offered by this system are highly appreciated features today.

In the 1970s, blast furnace process efficiency was increased through the injection of reducing agents directly into the furnace via the hot blast. The primary aim of this approach was to reduce to a minimum the use of metallurgical coke. The consumption of coke is the single-largest cost factor in hot metal production. As an alternative to heavy fuel oil and natural gas, pulverized coal injection (PCI) evolved to become a common industrial standard.

From the beginning, Paul Wurth was a key player in pioneering the injection technology in Europe. The first industrial application was implemented in 1980 on the ARBED blast furnace A in Esch-Belval, Luxembourg. As a supplier of dense-phase conveying equipment, flow-rate control valves for pulverized coal, “tailor-made” concepts for optimum coal distribution in the blast furnace, in-house design competence for coal grinding and drying plants and with references at more than 80 large blast furnaces, Paul Wurth is an international market leader in the field of cost-reducing blast furnace technology.
During the early 1980s in Ghent, Belgium, Paul Wurth worked with blast furnace operators at SIDMAR (now ArcelorMittal) to develop an innovative technology for near-furnace granulation of blast furnace slag. This was combined with the development of subsequent dynamic dewatering of the slag sand. The combination of these two steps created a process that is globally known under the name brand INBA®. Fundamentally, this process induces a thermal shock in the liquid slag, causing rapid solidification and granulation. As a result, the previously problematic by-product became known as Granulated Blast Furnace Slag – now an indispensable, highly vitrified raw material used in modern cement industries. The cold water granulation method employs closed-loop water systems and steam condensation to achieve lowest possible emissions. These features earn official recognition as BAT (best available technology) within Europe and around the globe.

The development of larger production units with higher yields introduced new challenges in BF process management. One particular result was the increase in heat transfer within the blast furnace. In response to this, Paul Wurth was quick to support the implementation of vertically arranged cooling plates, known as staves, connected to closed-loop cooling circuits. In the 1990s, Paul Wurth was among the pioneers who developed copper staves for the high-temperature zones in the bosh, belly and lower stack. Today, customers are offered integrated cooling/lining solutions for the furnace bottom, hearth and tuyeres as well as the entire stack wall. Careful design of these systems ensures extended blast furnace campaigns of 15 to 20 years. Factors such as high temperature loads resulting from PCI operation and flexibility in terms of economics and raw materials are taken due account of in the design.

In the late 1990s, Paul Wurth introduced advances in the process of top gas cleaning. The first implementation of this new concept was in 1999 on blast furnace No. 2 of Stahlwerke Bremen (now ArcelorMittal). Prior to the introduction of cyclonic dust removal by Paul Wurth, conventional dust catching systems were used. Cyclonic removal of dust is 85 percent efficient; a substantial improvement over traditional systems achieving 60 percent. One particular advantage
of cyclonic dust removal is the ability to optimize the system and establish a separation point for specific particle sizes. This in turn improves the potential to feed larger particles back to the sintering plant while minimizing the amount of heavy metal-laden fines requiring wet cleaning. The sludge produced in wet scrubbing of the fines (potentially containing high zinc concentrations) can eventually be directed to recycling plants.

The next stage of the gas cleaning process takes place in the annular gap scrubber, hydraulically adjusted venturi elements within this phase are also used in the regulation of pressure at the top of the blast furnace. After moisture has been removed from the cleaned blast furnace gas, its dust content is less than 5 mg/Nm³. This makes it suitable for applications in expansion turbines used for energy recovery or for feeding into energetic gas mixture networks. To date, this system has been in use on more than 100 blast furnaces worldwide.

The use of energetic blast furnace gas is paramount in the cycle of energy recovery within the system. Energy efficiency is a high priority for blast furnace operators. In an integrated steelmaking facility the blast furnace consumes 60 percent of all required energy. This can be illustrated through its use in the generation of local electricity, or drying pulverized coal. Further examples of energy recovery and efficiency are hot-blast stoves developed by Paul Wurth. Stove construction may implement an internal or external combustion chamber. Coupled with proprietary heat pipes, heat exchangers and a full range of modern process gas valves, the stoves battery is capable of preheating its combustion gas with its own exhaust gas. This provides lower operating costs with an energy-efficient solution.

Within the field of environmental technology, the Paul Wurth portfolio offers a wide range of dedusting systems. Specific to the blast furnace plant, the stockhouse and casthouse are areas of primary focus. The design and construction of exhaust facilities are implemented to provide low energy consumption and full compliance with environmental regulations. Use of the most modern filtration technology, typically bag filters, improves working conditions and provides the opportunity to direct ferrous residues back into the metallurgical process.

Cont’d on next page
**COMPANY PROFILE**

*Tapping systems* and dedicated *measuring technologies* are integral to modern blast furnace equipment. Reliable and reproducible performance of taphole drills, clay guns, runner cover manipulators and tilting runner drives is a critical aspect of casthouse floor operations. This equipment is essential to maintaining a responsive interface between the continuous operation of the blast furnace process and the periodic demand for hot metal from the steelmaking plant.

Increased automation within the ironmaking process is necessary to facilitate gains in efficiency and productivity. In many cases the level of automation in today’s blast furnaces is only possible with the use of sophisticated measuring systems. The human factor of critical decision-making is also dependent on the provision of timely, accurate information. In order to measure the transformation processes within the blast furnace, a combination of fixed instrumentation and specialized probes is employed. Measurements can be made both above and within the burden column providing information about the stockline level, geometric profile of the burden, and gas temperature and pressure. Paul Wurth’s decades of expertise in the domains of tapping and measuring have been utilized and managed since 2004 by TMT Tapping Measuring Technology, a joint venture formed with Dango & Dienenthal Maschinenbau GmbH (Siegen, Germany).

As mentioned above, blast furnaces today come with modern measuring and control technology. Reliably captured data about all measurable process parameters as well as reproducible condition messages from furnace equipment and ancillary systems can be used in mathematical models for the description of single processes that are important to the overall operating process. Paul Wurth combines such models, measurements, evaluation techniques and recommendations in its operator support system *BFxpert™*. It is possible to choose different modules for the specific requirements of a plant. This new approach to *blast furnace automation* – in the past, rather a black box – now provides the basis for transparent control of the process. It can be aligned, as desired, to priorities such as availability and safety, product quality, operating costs, environment or energy use.
Paul Wurth’s core competence, which encompasses all these technologies, can be summarized as **complete blast-furnace plant building**. Since the construction of the first blast furnace in Seraing, more than 220 project references have been added. In all these projects, the company played key roles in the design and construction of new plants or in the refurbishment and modernization of existing operations. Paul Wurth’s activities ranged from providing basic or detailed engineering and design, supplying technology and main equipment, supervising construction and installation through to acting as leaders of international consortiums and supplying plants on a turnkey basis. During the past 15 years, Paul Wurth has demonstrated its unique competence as world leader in the international blast furnace market by regularly implementing major blast furnace projects, not seldom several per year (some more recent examples are given in the table on the right).

**Most important blast furnace projects in the last five years**

<table>
<thead>
<tr>
<th>Customer</th>
<th>Plant</th>
<th>Commissioning</th>
<th>Usable volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil ThyssenKrupp CSA</td>
<td>BF's 1 &amp; 2</td>
<td>2010 New construction</td>
<td>each 3,284 m³</td>
</tr>
<tr>
<td>Germany ThyssenKrupp Hamborn</td>
<td>BF8</td>
<td>2007 New construction</td>
<td>2,300 m³</td>
</tr>
<tr>
<td>India SAIL Bokaro</td>
<td>BF2</td>
<td>2010 Modernization</td>
<td>2,586 m³</td>
</tr>
<tr>
<td>India TATA Jamshedpur</td>
<td>BF-H</td>
<td>2008 New construction</td>
<td>3,814 m³</td>
</tr>
<tr>
<td>India TATA Jamshedpur</td>
<td>BF-I</td>
<td>2012 New construction</td>
<td>3,814 m³</td>
</tr>
<tr>
<td>India RINL (Visag)</td>
<td>BF3</td>
<td>2012 New construction</td>
<td>3,814 m³</td>
</tr>
<tr>
<td>Kazakhstan ArcelorMittal Temirtau</td>
<td>BF2</td>
<td>2012 Modernization</td>
<td>2,283 m³</td>
</tr>
<tr>
<td>Mexico AHMSA Monclova</td>
<td>BF6</td>
<td>2011 New construction</td>
<td>1,593 m³</td>
</tr>
<tr>
<td>Russia NLMK Lipetsk</td>
<td>BF7</td>
<td>2011 New construction</td>
<td>4,185 m³</td>
</tr>
<tr>
<td>South Korea Hyundai Steel Dangjin</td>
<td>BF's 1 &amp; 2</td>
<td>2010 New construction</td>
<td>each 5,250 m³</td>
</tr>
</tbody>
</table>
New order | Posco SNNC has contracted SMS Siemag for the supply of the world’s largest submerged arc furnace for the production of ferronickel. The furnace, to be installed in Posco’s Gwangyang works in South Korea, will be equipped with six electrodes. The expansion of the works is to boost its annual production capacity from 30,000 to 54,000 tons of nickel. Commissioning is scheduled for the end of 2014.

The power rating of the rectangular-shaped FeNi smelter will be 140 MVA at a total nominal power input of 100 MW. To implement these performance values, furnace dimensions of 40 by 15 meters are required. “We are proud to work on this project together with Posco. Even for an experienced plant manufacturer such as SMS Siemag, a furnace of these dimensions is a very special project,” says Dr. Rolf Degel, Senior Divisional Specialist for the SMS Siemag Managing Board.

SMS Siemag’s scope of supply comprises the engineering, all supervisory services, the delivery of the furnace and the X-Pact® electrical and automation systems. The design of the smelter includes a thermally optimized air cooling system for the bottom part of the furnace shell as well as the sidewall copper cooling system for the slag line level developed by SMS. The required cooling rate is moderate, which will improve both the thermal efficiency and the productivity of the furnace.

The high-quality electrode columns are an SMS Siemag development specifically for rectangular FeNi furnaces. They are energy-efficient and ensure high availability levels. The furnaces are equipped with thyristors (power semiconductor components for high power levels), allowing for flexible furnace operation and maximum productivity.
Kazchrome, Kazakhstan

Successful tests with new metallurgical process

Together with its customer Kazchrome from Kazakhstan, SMS Siemag successfully tested the refining of high-carbon ferrochrome into medium-carbon ferrochrome in a vacuum converter. Also SMS Mevac participated in this project.

The tests, conducted in January 2013 in Finland at the works of the company Metso, demonstrated that this process is suitable to reduce the carbon content from eight down to one percent. “The objectives of the process are to shorten the process time and reduce the operating costs by operating under vacuum conditions and using CO₂ for cooling and decarburizing the melt. The attainment of both objectives has been successfully proven.”

PT Krakatau, Indonesia

Converter know-how

➤ New order | PT Krakatau Posco (PTKP), a joint venture between Pohang Iron and Steel Company (Posco), South Korea, and the Indonesian steel producer PT Krakatau Steel (PTKS), has placed an order with SMS Siemag for the supply of a basic oxygen steelworks complete with vessel changing and converter gas cleaning equipment.

The vessel changing equipment will reduce production costs. According to the customer, investment costs will also decrease by 30 percent. In a streamlined procedure, the converter vessel can be exchanged in eight to ten hours. This will markedly increase plant availability. PT Krakatau Posco is building an integrated iron and steelworks in Indonesia. In the first phase, annual production is expected to reach three million tons, in the second phase six million tons of steel. Commissioning is scheduled for the end of 2013.
Taiyuan Iron & Steel: Reduction in energy costs and CO₂ emissions

First X-Melt® Conarc® with energy recovery system for China

New order | The Chinese steel producer Taiyuan Iron & Steel (Group) Co. Ltd. (TISCO) has contracted SMS Siemag for the planning and supply of an X-Melt® Conarc® furnace unit with energy recovery system for a new long-product mill in Taiyuan, North China. The energy recovery system will increase the steelworks’ energy efficiency and contribute to reducing CO₂ emissions and energy costs.

The scope of supply for the 80-ton Conarc® with two furnace shells comprises the engineering, manufacturing of core components as well as supervision of erection and commissioning. The entire Conarc® plant will be equipped with X-Pact® electrical and automation systems (including level 2).

Furthermore, SMS Siemag will supply the electrode arms, SIS (SMS Siemag Injection System) burner and injector systems as well as the engineering and core components for the top lance for oxygen blowing. Other elements of the supply include the secondary voltage system, the oxygen valve station, hydraulic core components, pneumatic equipment, the carbon injection system as well as services, including supervision of installation and commissioning.

Thanks to the energy recovery system, CO₂ emissions can be reduced by approx. 25,000 tons per year. At a temperature of approx. 1,250 degrees Celsius, the waste gas from the Conarc® will be led through a boiler system that, on the one hand, provides for the cooling of the gas as needed and, on the other hand, uses a major
portion of the thermal energy for the generation of steam which can be put to further use in the steelworks. In the two boiler units, up to 60 tons of steam can be generated per hour.

The Conarc® furnace unit is part of a complete special steelworks project for which Tisco contracted SMS.

Within the scope of this project, SMS Concast will additionally supply two twin-ladle furnaces and a three-strand jumbo continuous caster for round blooms with diameters between 390 and 800 millimeters. The continuous caster will comply with the latest state of the art and be equipped with electromagnetic mold, strand and final stirrers, strand heating and dynamic soft reduction systems. All this will put Tisco in a position to produce round blooms in top quality. Among other things, these blooms will be used for manufacturing wheels for high-speed trains. In addition to high quality, the new investment will allow Tisco to achieve significantly improved material utilization and reduced transformation costs compared to the old plant. Commissioning of the plants is scheduled for March 2014.

The Conarc® process

The Conarc® process developed by SMS Siemag combines the technological benefits of the electric arc furnace with those of the conventional converter blowing process in one production unit with two identical shells. In the two furnace shells, the blowing lance and electrodes are used in turns. This makes it possible to process the charge materials of steel scrap, hot metal and direct-reduced iron ore (DRI) in various mixing ratios. The thus obtained flexibility allows the steelmaker to dynamically react to fluctuating market prices for energy and charge materials. Furthermore, it is possible to switch between burner and injector modes as required. Thus, the amount of electrical energy required is significantly reduced. The technological equipment includes a blowing lance, oxygen and carbon injectors, the materials management system and the gas cleaning plant. X-Melt® is an SMS Siemag trademark from the Steelmaking Division. It is the brand name for plants and technologies that set standards for the economical production of high-quality liquid steel.

Energy recovery

A newly developed two-stage boiler system is used for waste heat recovery. In the first stage, the waste gas is led through a swivel-type elbow, a post-combustion chamber and a hot-gas line, and cooled down to approx. 600 degrees Celsius. These components have been designed as pressure parts (pressurized components) for steam generation. In the second stage, the waste gas is cooled down to 200 degrees Celsius in a vertical-pass boiler specially developed for this type of application. Thanks to this concept, a significant contribution is made to sustainably improving the energy efficiency of the steelworks.
From a single source

**SMS Siemag and Paul Wurth receive orders from Gunung Steel Group**

The new gas cleaning plant from SMS Siemag will be built at the Gunung works in Bekasi. A convincing feature of the plant is its tailor-made environmental technology. “The dust-laden gases arising from the steelmaking process at the EAF and its auxiliary facilities will be efficiently captured and brought down to a residual dust content below 10 mg/Nm³,” says Dieter Kersten, Technical Sales Gas Cleaning Plants. The plant will be operated by speed-controlled fans, which consume a minimum of electrical energy while optimizing suction efficiency depending on the specific process. Back in 2011, Gunung had awarded SMS Siemag the orders for the Arccess® EAF proper and for the slab caster.

At Gunung’s site in Cibitung, Paul Wurth will build a new blast furnace. This furnace will have a working volume of 2,251 cubic meters and be designed for an annual hot metal capacity of up to two million tons. The scope of Paul Wurth’s supply includes the complete basic engineering and partial detail engineering as well as the supply of key components for the top-charging system, the furnace shell, the hot blast stoves, the wet-gas cleaning plants and the INBA® slag granulation system. Furthermore, the blast furnace will be equipped with the state-of-the-art BFXpert™ level-2 blast furnace control system.

The sinter plant will be designed for a nominal capacity of 2.4 million tons of sinter per year. The produced sinter will be used in Gunung’s future blast furnace.

The new coke-making plant of the stamp charging type will be supplied by Paul Wurth complete with a gas treatment plant and coke oven machines. Paul Wurth will provide the engineering as well as the key components for a new coke oven battery consisting of 66 ovens of 5.5 meters height. The facilities will be designed for an annual coke production of 755,000 tons. The contractual scope additionally comprises the coal tower, the coke quenching tower, the coke wharf, a complete gas treatment plant with a capacity of 44,000 Nm³/h of CO gas as well as the SOPRECO® system. Paul Wurth will also supply key items of the coke oven machines, including two sets of stamping-charging-pushing machines, one coke transfer car and one charging-gas transfer system.
Improving productivity and environmental protection

**SMS Siemag to revamp converter shop of Vizag Steel**

➤ **Modernization** | Visakhapatnam Steel Plant (Vizag Steel), India, has contracted SMS Siemag as the leader of a consortium for the modernization and expansion of their converter shop No. 1 in Visakhapatnam. The aims of this project are to increase annual production from 3.2 to 3.6 million tons of steel and improve environmental protection by installing an SMS Siemag gas cleaning system.

SMS Siemag will modernize both the primary and the secondary dedusting system. The gas cleaning system will be executed as a wet dust-collection facility with Venturi scrubber.

The scope of supply also comprises the engineering and manufacturing of core components for three new 150-ton converter vessels with tilt drives, the associated oxygen lances and bottom stirring equipment. SMS Siemag will be responsible for the entire installation and commissioning work. In addition to the supply of the core components, the converter shop No. 1 will be equipped with X-Pact® electrical and automation systems for the main and auxiliary equipment. This includes the complete modernization of the basic automation system (level 1) as well as the supply of the measuring and control equipment, drive systems and energy supply system for the converter shop. Commissioning is slated to take place in the first quarter of 2014.

At the same location, SMS Siemag is currently erecting an X-Melt® converter steelworks for Vizag Steel. This new steelworks No. 2 is to produce 2.8 million tons of liquid steel annually.
Fuxin Special Steel, China

Perfectly trained for production start

26 employees of Fuxin, who will be working at the special steelworks in Xiamen in the Chinese province of Fujian, which is currently under construction, participated in training at SMS Siemag in Düsseldorf. Major subjects of the training were technology and metallurgy for the stainless steelworks and the slab casting plant as well as environmental technology. The intensive contact between the Fuxin team and SMS Siemag during the training will certainly be beneficial to the cold commissioning of the equipment.

SMS Siemag is planning and supplying a steelworks for the production of stainless steel slabs to Fuxin Special Steel. This will be the first stainless steel plant worldwide to use the waste heat from the AOD converter and the EAF. The project comprises the construction of new facilities for stainless steel production at Xiamen in the southeast of the Chinese province of Fujian. Stainless steel production will be on the basis of scrap via the duplex route, a continuous slab caster and comprehensive environmental technology for gas cleaning and energy recovery. The new steelworks will be designed for a production of 720,000 tons of steel per year. Commissioning is planned to take place in the middle of 2013.

Salzgitter Flachstahl places order with SMS Elex

Revamp of electrostatic precipitator plant

➤ New order | In addition to the new converter vessel with lamella suspension system supplied by SMS Siemag, converter A in the steel plant of Salzgitter Flachstahl GmbH will now also be equipped with new filter technology developed by SMS Elex. The new equipment is to replace the existing precipitation and discharge electrode system. By means of this technology, the arising gases can be efficiently captured and cleaned, ensuring compliance with stringent environmental regulations. The electrostatic precipitator is characterized by very sturdy and thus long-lived, low-maintenance components.

SMS Elex is a joint venture between SMS Siemag and the Swiss company ELEX AG, which specializes in electrostatic precipitators. This joint venture unites SMS Siemag’s many years of experience in the development and construction of converter plants with the know-how from ELEX.
Pre-treatment (P), secondary (S) and tertiary metallurgy (T): SMS Mevac offers the full spectrum of technologies and services for steel producers to make the best possible steels. In this context, PST is not a mere marketing slogan. This is proved by numerous projects implemented by the company in the recent past.

For India’s Jindal Steel and Power, for example, SMS Mevac is currently supplying a hot metal desulfurization plant. This process involves the desulfurization of hot metal by injecting pulverized calcium carbide (CaC₂) and magnesium (Mg) via a refractory lance. The plant will also be designed for the future use of flowable lime as a desulfurizing agent. Alone during the past 25 years, SMS Mevac has commissioned almost 20 hot metal pre-treatment plants. In secondary metallurgy, references like the project at OMZ in Kolpino, Russia, speak for themselves.

For the OMZ project, the company of the SMS group supplied an outstandingly compact ladle-metallurgy center, which consists of a ladle furnace, VD and VOD plant. The facility can produce ingots of up to 500 tons weight. Other secondary-metallurgy plants were recently commissioned at Dragon Steel Corporation and China Steel Corporation, both in Taiwan. “We provide our customers with excellent secondary-metallurgy solutions,” says Managing Director Michael Thiehofe. “We also supervise installation and commissioning activities and train the operating personnel. And after the commissioning, we support our customers with our services.”

Also in the still new field of tertiary metallurgy, SMS Mevac has been scoring successes. Presently, the company is engineering a VIM X-eed® vacuum induction melting furnace for Tata Steel Speciality Steels in Stocksbridge, UK. “In this project, we can tap many synergies from our experience in secondary metallurgy,” adds Thiehofe. “We balance process technologies, market requirements, customer demands and environmental responsibilities.”

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Tertiary metallurgy

**SMS Mevac: VIM furnace for Tata Steel Speciality Steels**

Tata Steel Speciality Steels has placed an order with SMS Mevac to design a VIM X-eed® vacuum induction melting furnace for its Stocksbridge, UK, site. The new furnace will produce high-purity steels and specialist alloys for the aerospace industry, a sector where Tata Steel is already established as a leading supplier. The project is currently in the design phase and is intended to go into production in 2014, pending final capital approval.

Mark Broxholme, Managing Director of Tata Steel Speciality Steels, stated: “The potential addition of a VIM furnace to our asset base for aerospace steel production is an exciting prospect. This initiative is fully aligned with our business strategy of focusing on high added-value products for markets with truly global reach. We are pleased to be collaborating with the SMS group who have the stature and expertise to bring this project to a successful conclusion.”

SMS Mevac, a market leader in primary and secondary steelmaking with more than 40 years of experience as a plant builder, has expanded its portfolio to include the segment of tertiary metallurgy/special steels utilizing its extensive plant engineering know-how. This strategic move into tertiary metallurgy currently incorporates three key melting and remelting technologies, namely VIM, VAR and ESR units.
This new product area is managed by experts who have more than 20 years of experience with market-leading producers of specialist steels. This know-how creates state-of-the-art facilities that will meet both current and future market requirements.

Cihangir Demirci, Deputy General Manager Tertiary Metallurgy at SMS Mevac, commented: “I’m very happy to be able to apply my extensive knowledge of specialty steelmaking and superalloys to the design of this new VIM unit with integrated vacuum pouring. Designing from the standpoint of a producer means that we will set very great store by aspects like reliability and maintenance. This will result in a unit operating with consistently high availability and performance.”

The VIM unit for Tata Steel comprises an 8-ton vacuum induction melting crucible together with the associated vacuum pumping, material charging and process control equipment. All core components to be delivered by SMS Mevac will be designed to allow Tata to increase the melt size to 18 tons at a later date. Ancillary equipment for crucible preheating and lining maintenance is also included in the supply scope. The unit incorporates vacuum ingot pouring for both top-poured and bottom-poured ingots, in single or multiple ingot configurations. The ingots will then be refined in Tata’s VAR facilities before being rolled or forged into products for the aerospace market.

Michael Thiehofe, Managing Director at SMS Mevac, stated: “SMS Mevac is honored to be the chosen supplier for the VIM X-eed® unit for the Stocksbridge works. We will closely cooperate with Tata Steel’s experts to design a plant which will satisfy the requirements of this demanding, high-end market.”
RH plant No. 8 in operation

Convincing secondary metallurgy

➤ Commissioning | In Kaohsiung, Taiwan, China Steel Corporation (CSC) has commissioned a further RH plant from SMS Mevac. The company now operates six RH plants (RH 1 and 3 in steelworks No. 1 and RH 2, 4, 6 and 8 in steelworks No. 2) as well as one VOD plant. All vacuum facilities in operation at CSC were supplied or modernized by SMS Mevac.

Special features of the new plant include the TOP lance with integrated burner mode and a jet-needle-controlled steam ejector pump system. Apart from these features, it is of a similar design to RH plants 4 and 6. The new plant will be used primarily for the treatment of ULC grades for the automotive industry (IF grades), electric sheet, pipe grades and common carbon steel grades. In an interview, J.Y. Lee, Engineer Ladle Refining No. 2 Steel Making Department, explains for which purposes the company uses the new plant and how the cooperation with SMS Mevac went.

Newsletter: For which applications does CSC treat the steel in the new plant?
Lee: The steel is intended for use in very different areas. For example, we produce high-strength grades for use in the construction industry, ULC grades for the automotive industry as well as for electrical applications. Other products are used in pipeline construction. Most of these applications have one thing in common: the steel must be able to cope with heavy loading. In other words, it must be of high quality. This was one of the reasons why we chose RH plants from SMS Mevac.

NL: How satisfied are you with the SMS Mevac plants?
Lee: The technical solutions are highly impressive. The plants excel in terms of quality. And they are very reliable, just like the SMS Mevac team.

NL: How would you describe the cooperation with SMS Mevac during the recent RH project?
Lee: It was excellent. SMS Mevac has the experts we need. They have a lot of process know-how and expert knowledge of the plant technology. We will certainly stay in contact with the SMS Mevac engineers, because only they know how to make operation of the RH plants even more efficient.

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High flexibility, low maintenance effort

**Hydraulic oscillation system for Gallatin Steel**

➤ **New order** | Gallatin Steel, Warsaw, Kentucky, U.S.A., has awarded SMS Siemag LLC, Pittsburgh, Pennsylvania, a contract to design and supply a hydraulic oscillation system for their CSP® caster to replace the originally supplied electro-mechanical system. The installation is part of Gallatin’s continuing efforts to enhance product quality, improve operational flexibility and reduce maintenance costs.

The four-cylinder oscillator system facilitates precise movements of the oscillation table and eliminates the need to synchronize multiple eccentrics that may lead to misalignment or table wobbling. The design was developed by SMS Siemag as a replacement option for both CSP® (Compact Strip Production) and conventional casting machines, especially for space-limited applications. At several reference installations, the simultaneous optimization of stroke and frequency parameters has achieved reliable production with high product quality.

SMS Siemag will provide the engineering and supply of the complete mechanical, hydraulic and X-Pact® automation systems. Associated spare parts and maintenance equipment are included, along with basic engineering for the infrastructural changes necessary to incorporate the new design, and an improved steam evacuation system. Prior to shipment, the entire oscillation system is scheduled to be shop-tested through the complete stroke and frequency range, to streamline start-up and commissioning. Commissioning is scheduled to take place in the second half of 2013.

Gallatin Steel operates a single-strand CSP® facility, which started up in 1995. With the implementation of the new equipment, Gallatin will have successfully taken another step towards their goals of improving quality and productivity. With the possibility of expanding the product range, Gallatin will also be able to better serve their customers.

The hydraulic oscillation system for Gallatin Steel is being manufactured at SMS Siemag in Hilchenbach.
Acroni, Slovenia

Short downtime, high performance

➤ Modernization | The 2.6-m heavy-plate mill installed at the Slovenian steelmaker Acroni in Jesenice could commence production much faster than expected. During a downtime, SMS Innse, a company of the SMS group, modernized the mill within a period of merely 34 days. “We not only managed to comply with the tight time frame we had set, but were able to nearly halve it. This success is due to the excellent preparation and cooperation with our customer”, says Project Manager Emiliano Fiorentini from SMS Innse.

Back in 2010, the Slovenian steel producer awarded SMS Innse the order to supply a new four-high mill stand. The new facility, including turntable, hydraulic side guides at the entry and exit sides, and edger, is used as a roughing and finishing stand for the production of plates and as a roughing stand to produce coils in combination with the Steckel mill.

The erection work, including the installation of new work-roll and backup-roll changing systems, new main drive spindles, and new automation equipment with technological functions, was finished in December 2012. During the plant downtime, the old equipment had been removed, civil work carried out, and the new facilities erected and commissioned. The first slab was successfully rolled on January 5, 2013. Within the first ten days of production, an output of 7,000 tons of plates could be achieved.

Roman Robic,
Head of Technology Hot Rolling Mill, Arconi

Newsletter: What does your company Arconi stand for?

Roman Robic: We are a small steelmaker. Our products stand for a very high level of quality. We produce stainless steel, electrical steel strips and special steels.
Could you please explain why this modernization of the heavy-plate mill was necessary?

Robic: The plant was built in 1963. Hence, this modernization was indispensable to ensure future production of top-quality material. With the new four-high mill stand we can now offer a wider range of products, and that is exactly what our customers want.

How satisfied are you with the modernization?

Robic: This was our first cooperation with Innse, and it was very professional. We at Acroni have a vast know-how in the production of plates. SMS Innse responded well to our requests and supplied high-tech equipment. Thanks to the good joint preparation, the mill stand could be replaced in a much shorter time than anticipated.

Tata Steel Ijmuiden, Netherlands

Reinforced coiler for high-strength steels

Modernization | In February 2013, Tata Steel granted SMS Siemag the final acceptance of the modernization of coiler No. 3 in its hot strip plant in Ijmuiden, Netherlands. Thanks to the conversion measures, the over 25-year-old coiler is now able to coil hot strip of higher strengths and greater thicknesses.

“Our aim was to prepare coiler No. 3 for coiling strips of higher strengths as are increasingly demanded by the market today and to keep investment costs as low as possible. This was definitely achieved,” sums up Peter Aberkrom, Project Manager of Tata Steel Ijmuiden. One of the essential factors contributing to the low investment costs was that the existing coiler mandrels could be re-used after they had been reinforced in the workshop of SMS Siemag. The modernization of the coiler covered its technological design to suit the new requirements and the installation of new components such as stronger gear units for the pinch roll set and the coiler mandrel drive, new hydraulic valve stands, and the reinforcement of the existing coiler drive. Another newly installed item is the hydraulically controlled chute roll which supports the coiling of high-strength steel grades. SMS Siemag furthermore rendered assistance in the introduction of a strategy for coiling high-strength strips.
Revamp at TKSE Bochum
Better strip quality through modernization

Modernization | SMS Siemag revamped the finishing mill and the cooling line in the Bochum works, Germany, of ThyssenKrupp Steel Europe (TKSE). This step enables TKSE to attain closer hot strip tolerances and, due to amended cooling strategies and higher cooling rates, to keep on broadening its product portfolio.

The hot strip mill in Bochum was put on stream in 1966 and focuses, within the group, on the production of stainless and special steel grades, among other things. In the last few years, SMS Siemag has equipped the plant with a new edger and a new flying crop shear. Following completion of the modernization of the finishing mill and the strip cooling line in mid-2012, TKSE has been able to improve the strip quality in respect of thickness, profile, and flatness, and to enhance its range of products thanks to the new cooling line.

Revamp of the finishing mill. Stands F1 to F4 of the finishing mill were fitted with new hydraulic adjusting systems; the maximum rolling force was raised to 45 MN. To absorb the increased rolling forces, the stands were equipped with new Morgoil® bearings of the KLX® series. While the new hydraulic adjusting systems serve to set the strip thickness more precisely, the installation of CVC® plus systems and stronger work-roll bending systems in stands F3 to F5 permits TKSE to attain closer strip contour, profile, and flatness tolerances. These stands were furthermore fitted with Sieflex® gear-type self-aligning spindles which, due to their internal continuous circulating oil lubrication, are easy to maintain and feature a long life cycle. In the course of the conversion, SMS Siemag additionally replaced the interstand equipment and modernized the roll changing devices.

Changeover operation of the automation system for rapid ramp-up. On the electrics and automation side, SMS Siemag supplied a new level-2 automation system for the finishing mill including profile and flatness model. The new automation system was initially operated parallel to the existing system. Thanks to the option of running the system in the shadow mode and of changing between the old and new systems, it was possible to test and ensure full functional performance of the new automation system. During this phase, the operating personnel had the opportunity of becoming familiar with the new system under production conditions. The SMS Siemag specialists instructed the TKSE operators in parallel training courses and provided assistance as part of production support at the plant. The positive effect of this concept was apparent after the revamp. The plant could be ramped up to its nominal capacity within a very short time.

The new equipment is pre-assembled in the SMS Siemag workshop. Specialists from SMS Siemag support the TKSE staff.
To implement the complex modifications in the stands within the shortest possible time, SMS Siemag carried out comprehensive pre-assembly work in its Hilchenbach workshops, comprising CVC® shifting systems, work-roll bending systems, entry and exit guides, lifting rails, loopers, and even the work rolls.

**Cooling line modernized.** SMS Siemag replaced the complete old spray cooling by a modern laminar cooling system with intensive cooling groups at its starting end. As the strip is applied with higher water volumes there, TKSE can achieve steep cooling ramps as are required for special grades. In the so-called trimming zone at the exit end of the strip cooling section, the cooling temperature can be set precisely.

The optimum cooling strategy is preset by SMS Siemag’s new X-Pact® cooling model. It is based on the description of the decisive physical processes such as heat conductivity in strip thickness direction, heat transfer in air and water zones, and the forming behavior of the material during the cooling process, and it calculates the suitable cooling curve for each strip.

**Extent of modernization**

- F1 to F4: New hydraulic adjusting systems
- F3 to F5: CVC® plus, work-roll bending system, Sieflex® gear-type self-aligning spindles, modernization of roll changing devices, new laminar pre-cooling line, new X-Pact® automation system for finishing mill with PCFC (Profile, Crown, and Flatness Control) and laminar cooling line

**Super-reinforced cooling units for Benxi Iron & Steel**

**Higher cooling rates for demanding steel grades**

The first five of 20 cooling groups are now equipped with super-reinforced cooling units.

► **Modernization | Benxi Iron & Steel, China,** boosted the cooling performance of its laminar cooling system by installing the SMS Siemag-made super-reinforced cooling units. This step will enable the Chinese steelmaker to enhance its product portfolio especially in the field of tube and pipe steels.

In the course of this modernization, SMS Siemag replaced the first five of a total of 20 cooling groups by super-reinforced cooling units which can apply an almost three times higher specific water volume as compared to the remaining groups. At low investment costs, Benxi Iron & Steel is now able to attain, in particular for tube or pipe steels, the high cooling rates that are needed to set the desired metallurgical structure with corresponding properties on the basis of economic alloying concepts.

The new cooling system can be controlled in a very flexible way since each individual cooling header within any one group can be separately switched on or off. This enables Benxi to vary the cooling rates within a wide range and to employ super-reinforced cooling for steels without particular demands, too. Furthermore, water volume distribution to top and bottom headers was adjusted to attain good strip flatness even in the case of very high cooling rates. With an annual capacity of more than five million tons, the hot strip mill supplied to Benxi by SMS Siemag in 2008 is a real high-performance plant and designed for carbon as well as stainless steel grades.
Ningbo Xingye Copper orders two reversing cold rolling mills

➤ New order | Ningbo Xingye Copper placed an order with SMS Siemag for the supply of two reversing cold rolling mills for copper and copper alloys. The company is part of the Xingye Copper International Group Limited, a leading producer of high-quality copper strip and copper plate products in China. With the new order, SMS Siemag is playing a part in the current developments in the narrow-strip segment.

Today, the use of copper as a high-tech material is essential. In the recent past, new copper-based alloys have been developed, which are mainly used in electronic applications. The material plays a significant role as a key component used in LEDs, electric vehicles, photovoltaic systems and wind turbines, and of course cables for the transmission of electric current.

Copper is a very valuable metal and its resource-saving processing places high demands on the plant technology. Rolling mills from SMS Siemag meet these demands. This, in connection with the company's competence as a supplier of mechatronic systems, induced Ningbo Xingye Copper to award the order to SMS Siemag.

With the two new cold rolling mills, Ningbo Xingye Copper will produce copper strip mainly for applications in the field of electronics. The material is used in semiconductor technology, for example. Important final products are so-called lead frames and semi-finished products for further processing in LED technology.

Ningbo Xingye Copper’s customers have very high demands on strip thickness and flatness tolerances and on the surface quality of rolled strips. The new cold rolling mills will roll alloys with extraordinary elements, such as copper beryllium and copper iron, as well as the customary copper and copper alloys, such as brass and bronze.
SMS Siemag designed the rolling mills in such a way as to ensure high material utilization at extremely small off-gage lengths in order to process the copper in an economic way. The two cold rolling mills will be erected at two subsidiaries of Ningbo Xingye Copper.

The four-high mill at Ningbo Xingye Shengtai Group Co., Ltd. will be fed with starting material made on semi-continuous casters or by the hot rolling mill. The feedstock consists of bronze and copper-nickel-silver alloys. The material range of the hot rolling mill includes copper, copper beryllium, copper iron, brass and copper-nickel-silicon alloys. Prior to cold rolling, the surfaces of continuously cast or hot-rolled transfer bars are milled in order to mechanically remove scale and segregations from the strip surfaces. Thereafter, these strips, up to 16 millimeters thick and loosely wound, are transported to the cold rolling mill for further processing.

The loosely wound coils with a variable coil inside diameter are then forwarded to the pay-off unit. Owing to the large range of strip gages, the winding stations consist of a combined reel wheel and drum with different coiling diameters. The strips to be rolled are coiled under strip tension over the complete strip gage range. The finish-rolled coils are then coiled onto the reel drum and transported for further processing.

The four-high mill stand rolls strips of 420 to 680 millimeters width with an entry thickness between nine and 16 millimeters. The special feature of the rolling process is that the strip is inserted into the closed roll gap in order to roll the thick and relatively short strips completely from the strip head to tail ends. The strip tail end leaves the roll gap and is threaded-in again for the reversing pass. In this way it is possible to roll the complete length of the strip to the target gage. This minimizes off-gage lengths at the strip head and tail ends. Reliable actuators such as a hydraulic adjustment system, positive and negative work roll bending, pivoting of the stand and multi-zone cooling system ensure the required strip gage of 0.5 to 4.0 millimeters and flatness. The annual capacity of the rolling mill is approx. 75,000 tons. In July 2014, the reversing cold rolling mill will start operation in Ningbo City, in Zhejiang province.

A short time later, in October 2014, the 20-high cold rolling mill will roll its first coil at the same location of Ningbo Xingye New Metal Materials Co., Ltd. This plant in split-block design of size SB23-26" will further process strips into thin strip.

Cont’d on next page
Ningbo Xingye Copper

Highest level of precision for copper rolling

The split housing design of the stand is especially advantageous for this type of utilization. The process heat is discharged in a more profitable way and the cooling effect improved, since the roll chocks are split for taking up the 20-high roll assembly. The larger roll gap facilitates threading in the strip head end. Moreover, the stand is very easily accessible and allows the use of variable work roll diameters.

Entry and exit sides are equipped with reversing reels with belt wrappers in order to wrap small strip thicknesses even in sleeve operating mode. The strips are 400 to 660 millimeters wide and have a maximum entry thickness of up to 2.5 millimeters.

Rolling is done at a maximum speed of up to 800 meters per minute. With the actuators, hydraulic adjustment system, roll crown adjustment of axes A to D and intermediate-roll shifting, the rolling mill can meet all requirements regarding the strip thickness and flatness tolerances. The minimum final gage is 0.05 millimeters.

Rolling oil residues are reliably removed from thin and surface-sensitive finished strips by means of a proven squeezer system. Paper wrappers are also supplied in order to meet the high requirements on the strip surface. The annual production capacity of the rolling mill is more than 55,000 tons.

For both plants, SMS Siemag delivers the complete engineering, the mechanical components, X-Pact® electrics and automation systems for control and supervision of the complete cold rolling process, including all measuring instruments and drive units. In the case of the four-high stand, this includes a customized pass-schedule calculation system in addition to a new X-Shape flatness measuring system. The calculation system is based on the technological experience gained with other copper rolling mills supplied by SMS Siemag and on knowledge provided by the in-house research and development department. The 20-roll mill stand is also equipped with a level-2 offline model. A MultiPlate® filter with highest filter mesh size, which is also part of the scope of supply of SMS Siemag, ensures environmentally compatible and resource-saving cleaning of the rolling oil.

With the order from Ningbo Xingye Copper and after supply of the reversing cold rolling mill for Chinalco Shanghai Copper Co., Ltd., SMS Siemag has finally become established as a reliable equipment supplier on the Chinese copper market.

Contact: cm-steel@sms-siemag.com
Tailored modernization concept

Tandem mill at Ruukki to receive upgrade

Modernization | SMS Siemag is modernizing the tandem mill of the Finnish steelmaker Ruukki at its Haemeelinna location. The cold rolling mill is being equipped with high-precision adjustment systems.

The four-stand quarto tandem mill has been in operation since 1972 and is the central facility for cold strip production at Ruukki. Here, carbon steel strips with widths ranging from 540 to 1,575 millimeters and maximum entry gages of up to 6.30 millimeters are rolled down to final gages as thin as 0.30 millimeters. The annual capacity amounts to 1,250,000 tons.

Before the contract was awarded, investigations were performed by SMS Siemag with the aim of defining measures by means of which the quality level, productivity and economic efficiency of the plant can be increased step by step. In addition, Ruukki wanted to enlarge the portion of high-strength grades in the product mix. On this basis, a modernization concept was prepared in cooperation with the customer.

In 1998, SMS Siemag had already equipped mill stands 1 and 2 with state-of-the-art hydraulic adjustment systems. Within the scope of the current order, mill stands 3 and 4 are now being provided with hydraulic adjustment systems which are characterized by high positioning accuracy, precise roll gap adjustment and good accessibility as well as serviceability. Thus, performance and reliability of the tandem mill are again significantly improved.

All quality-relevant components are manufactured and subjected to extensive tests in the SMS Siemag workshop in Hilchenbach. This ensures smooth installation at Ruukki, so that after just one short revamping shutdown period, the plant can resume operation at the end of July 2013.

Experience counts

Sophisticated modernization concepts by SMS Siemag help the customer attain maximum improvement of the plant performance at minimum effort and costs. The experience of numerous business departments of SMS Siemag have been incorporated in the customized concept for modernization of Ruukki’s tandem mill. Another essential factor is the close cooperation and coordination with the customer throughout all project phases.
Reliable at high rolling speeds

**New Nipco® oil wiper unit in operation**

In May 2012, the new wiper unit at Outokumpu Nirosta, domiciled in Dillenburg, Germany, successfully started operation in a 20-roll stainless-steel cold mill evidencing its worth by lower operating costs and further advantages.

Having installed a new high-performance Nipco® oil wiper unit to the great satisfaction of the customer Outokumpu Nirosta at its location in Düsseldorf, Germany, Outokumpu entrusted SMS Siemag with the supply of a further Nipco® system for one of the existing cold rolling mills in its Dillenburg works. This 20-roll cold mill stand for stainless steel strip processes strip widths up to 1,350 millimeters at a maximum rolling speed of 880 meters per minute. The intention here was to replace the existing oil wiper units by the Nipco® system developed in cooperation between Voith and SMS Siemag.

> “With the Nipco® system we can reliably roll even thin dimensions at speeds of 800 meters per minute. The wiping result is reproducible, and, due to the significant reduction of compressed-air consumption, the operating costs are lower compared to the old system. Finally, the effort required for repair in case of failure is lower than previously.”

> Jörg Kazmierski, Team Manager Cold Rolling Mills, Outokumpu Nirosta, Dillenburg works

The scope of supplies comprises the complete new Nipco® oil wiper unit at the entry and the exit sides of the mill stand as well as the required rolling-oil pressure boosting station. The system was installed and commissioned in the Dillenburg works in the summer of 2012.
Advantages resulting from the Nipco® system:

- Uniform wiping effect over the full width of the strip
- Reduction of residual oil on the strip by up to 60 percent
- Improvement of the strip coiling behavior
- Increase in productivity by higher rolling speed
- Highly reproducible wiping results along with easy operation and less non-productive times
- No separate, closed hydraulic-oil circuit
- Reduction of roll wear and increase of service lives
- Adaptation to all rolling media (rolling oil, emulsion, and kerosene)

Axle with elements for hydrostatic support of the roll shell.

According to schedule: On December 14, 2012, the first strip was rolled on the new 20-roll cold mill at Bahru Stainless SDN BHD in Johor Bahru, Malaysia.

Tight schedule met
20-roll cold mill at Bahru
Stainless rolls the first strip

The Asian company Bahru Stainless SDN BHD is a subsidiary of the Spanish Acerinox Group and has established a new production site for stainless-steel cold strip in South Malaysia. This plant includes a 20-roll cold mill, size MB22B-52", made by SMS Siemag.

The compact and robust cold rolling mill processes austenitic and ferritic strip grades with a width of up to 1,320 millimeters and a starting thickness of up to 6.35 millimeters, and reduces them to final gages of a minimum 0.15 millimeters. In addition to the rolling mill itself, SMS supplied the entry and exit groups, leveler and crop shear, as well as the Supafine® filter system to efficiently clean the rolling oil. Through the implementation of the first stage of the new production complex in Johor Bahru with an annual capacity of 240,000 tons, Bahru Stainless has achieved an important milestone. The next stage is intended to boost the capacity to 600,000 tons of stainless-steel cold strip.

Pleased with the first strip. Left to right: Frank Lettau, Project Manager SMS, Brent Welty, Rolling Mill Manager Bahru, and Tim Lotte, Project Manager Electrics SMS.
High capacity and cost efficiency

**Tisco orders two tandem cold-rolling mills for stainless-steel cold strip**

➤ **New order** | The Chinese stainless steel producer TISCO (Shanxi Taigang Stainless Steel Company), a subsidiary of the Taigang Group International Trade Co., Ltd., has awarded an order to SMS Siemag for the supply of two six-high continuous tandem cold mills of CVC® plus and 18-HS design, each with a strip cleaning section. Tisco is thus enhancing its capacity by more than one million tons of stainless steel strip per year.

Each cold rolling mill constitutes the nucleus of an integrated, continuous production line for stainless-steel cold strip, known as a White-Sheet Rolling, Annealing, and Pickling Line (WRAPL). The two new production lines are being erected by a consortium in Taiyuan City in the Chinese province of Shanxi. The WRAPL configuration will enable Tisco to produce stainless steel in a particularly economic manner because the processing steps of rolling, annealing and pickling take place in a single pass.

The consortium includes SMS Siemag as the supplier of the tandem cold mills with the two strip cleaning sections and bridle roll sets. Both tandem cold mills process hot strip that is pretreated in the hot-strip annealing and pickling line also supplied by SMS Siemag.

**TCM 400.** The six-high tandem cold mill processes stainless steel strip of the AISI 400 series with an annual capacity of up to 500,000 tons. It is installed between a continuous entry looper and the strip cleaning section, likewise supplied by SMS Siemag, and followed directly by a continuous exit looper. With its modern adjustment systems, the five-stand rolling mill allows flexible operating practice and safeguards the high quality of the rolled strips. These systems include CVC® plus, positive and negative work roll and intermediate roll bending in all mill stands, and multi-zone cooling which provides final adjustment of flatness.
The stainless steel strips run into the tandem cold mill at a speed of up to 150 meters per minute. The exit speed in the final mill stand is 340 meters per minute. In the exit section of the line, the finished strip is wound into coils with a maximum weight of 35 tons. The tandem cold mill operates continuously and stops only for roll changing. Work roll and intermediate roll changes are performed in a fully automated manner with the strip threaded in. Backup roll changing is semi-automated and takes place only during the specified maintenance shutdowns. This enhances the high availability of the mill.

**TCM 300.** This tandem cold mill of 18-HS design is the second one of its kind worldwide. The first one was built by SMS Siemag in 2009. It rolls stainless steel strip of the AISI 300 series with an annual capacity of up to 600,000 tons. The material, i.e. annealed and pickled stainless-steel hot strip, runs into the five-stand rolling mill at a speed of up to 170 meters per minute.

In the exit section, the process speed is a maximum 370 meters per minute. The finished coils in the exit section have a maximum weight of 35 tons. The high-tech tandem cold mill has five mill stands of 18-HS design (HS = Horizontal Stabilization). Thanks to the slim work rolls, very high pass reductions are achieved with low roll forces and a particularly cost-efficient production is ensured.

**Strip cleaning sections.** Both tandem cold mills are each completed by a strip cleaning section from SMS Siemag. Following the rolling, the strip runs through an approx. 30-meter-long horizontal cleaning section, where the adhering rolling emulsion is removed from the surface in several process steps. The individual process steps are separated from one another by squeezer rolls and have their own circulation systems.

The actual strip cleaning system consists of two spraying sections, each followed by a brush scrubber. In the spraying sections, the surface is heated and pre-cleaned by spraying hot alkaline cleaning solution onto it. Following this, the strip surfaces are subjected to abrasive cleaning on both sides by rotating brushes in the brush scrubbers. Downstream of this is a three-stage cascade rinsing unit for the removal of alkaline solution residues from the strip. In the three spraying zones, the strip is sprayed on both sides with demineralized water. Squeezer rolls are located upstream and downstream of the spraying zones. Any moisture remaining on the strip is finally removed by means of a gas-heated horizontal circulation-air nozzle dryer.

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### Technical data, TCM 400 and TCM 300

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**Starcore, Thailand**

**Rolling and skin-passing in one mill stand**

of the new reversing cold mill at Starcore Co. Ltd., in the Thai city of Rayong. Starcore now disposes of an additional production capacity of 200,000 tons of high-grade cold strip and an extra skin-passing capacity of 146,000 tons per year. The combined Reversing Cold Mill and Skin-Passing Mill (RCM/SPM) is capable of rolling and skin-passing strips of up to 1,250 millimeters width at a maximum rolling speed of 1,200 meters per minute. The minimum final gage is 0.2 millimeters. Starcore supplies the products to its own parent company, Saeng Thai Metal Drum Company Limited (STD), and to the Southeast Asian market. The combined cold rolling mill in four-high design and with CVC® plus technology was installed by Esmech Equipment. Core components such as cylinder and bending blocks as well as CVC® shifting systems were provided by SMS Siemag’s workshop in Hilchenbach. To ensure smooth erection and commissioning, the complete mill stand was pre-assembled in the workshop of Esmech in Wada.

**Benxi Iron & Steel, China**

**Entering stainless steel production**

> **Commissioning** | In the autumn of 2012, Benxi Iron & Steel, China, successfully rolled the first stainless steel strips on both of their new 20-roll cold mills supplied by SMS Siemag. This means that Benxi has an annual production capacity of 200,000 tons of stainless steel strip now. On September 29, 2012, cold rolling mill No. 1 started production in the Chinese city of Dandong. The first strip having a width of 1,250 millimeters and a thickness of 2.5 millimeters was rolled to a final gage of 1.2 millimeters in five passes.

“The fact that this success could be repeated on the second cold mill six weeks later, gave Benxi great satisfaction as the company has had a fully operational production site for stainless steel strip in Dandong since November 2012,” comments Frank Lettau, SMS Siemag Project Manager in charge, on this achievement. An essential reason for this success was that the core components of both rolling mills were manufactured in SMS Siemag’s own workshops in Hilchenbach.

Contact: cm-stainless@sms-siemag.com
Thin strips for Vietnam
NAM KIM Steel orders RCM plant

➤ New order | NAM KIM Steel, domiciled in Thuan An Town, Vietnam, placed an order with HB Esmech Equipment Pvt. Ltd., the Indian joint venture partner of SMS Siemag, covering a six-high Reversing Cold Mill (RCM) with CVC® plus and the proven rolling technology of SMS Siemag. The RCM will be put on stream at the beginning of 2014. NAM KIM Steel Joint Stock Company was founded in 2002 and sells finished-surface cold strip particularly on the domestic market, but also in Southeast Asia, Australia and the Middle East. The new RCM will roll strips of low-alloy carbon steels with a maximum width of 1,250 millimeters and starting thicknesses of up to 4.0 millimeters. The minimum final gage will be 0.11 millimeters. Rolling speed will reach up to 1,400 meters per minute. The scope of supplies includes CVC® plus technology as well as work- and intermediate-roll bending systems. Core components will be manufactured in the Hilchenbach workshop. Nozzle beams arranged on the entry and exit sides will distribute the rolling emulsion. The plant is scheduled to start operation in January 2014. It will set new standards for the production of top-quality cold strip in Vietnam.

Higher rolling capacity, modern mill stand ergonomics
Modernization of hot strip mill at Aluminium Norf

➤ New order | In November 2012, Aluminium Norf GmbH in Neuss, Germany, entrusted SMS Siemag with the modernization of its hot strip mill No. 1. Aluminium Norf operates the world’s largest aluminum rolling mill and smelter. Hot strip mill No.1 is a central production plant that was established by SMS Siemag in the sixties. SMS Siemag is now to modernize the roughing stand of the hot strip mill.

The most urgent goal is to boost the rolling capacity. The roughing stand will be equipped with a new mechanical and hydraulic adjusting system, a modern stand housing, and an exhaust system in the mill stand area. To safeguard the high product quality of the mill, Aluminium Norf wanted the mechanical components to be manufactured in the Hilchenbach workshop of SMS Siemag. The conversion is scheduled for the end of December 2013.
Shandong Nanshan, China
Aluminum hot rolling mill and cold rolling mill for automotive applications

➤ New order | The Chinese aluminum producer Shandong Nanshan Aluminium Co., Ltd. is again relying on the competence of SMS Siemag in the field of rolling mill technology. In November 2012, the company awarded a contract for the supply of a 1+5 hot rolling mill for aluminum and aluminum alloys.

The contract signing ceremony was attended by Dieter Rosenthal, Member of the Managing Board of SMS Siemag, and Song Changming, Vice President of Nanshan Group Co., Ltd. The order covering a cold rolling mill was placed shortly thereafter.

Shandong Nanshan Aluminium is one of the leading producers of aluminum in China. The company belongs to the Nanshan Group domiciled in Longkou. With these new contracts, Shandong Nanshan underlines, for the third time, its confidence in the plant technology provided by SMS Siemag. The first order included two single-stand cold rolling mills with CVC® plus technology, and in 2012, a three-stand tandem cold mill started operation.

Hot rolling mill. From the end of 2014, the new 1+5 hot rolling mill for aluminum and aluminum alloys will make aluminum strips to be used for the production of beverage cans and of plates and sheets for the automotive and aviation industries at the Yantai works in the province of Shandong. In the first stage of construction, an annual capacity of 300,000 tons will be achieved. The hot rolling mill comprises one plate stand and a five-stand finishing mill. The supply package includes all media systems and an offline coil inspection line as well as a pallet transport system for coil handling.
In the first construction stage, the mill will produce plates up to a width of 3,800 millimeters and strip up to 2,800 millimeters in width. The minimum final thickness of the hot strip will be about 1.8 millimeters. In a later construction stage it is planned to add a 5.6-meter-wide hot-plate rolling mill and to extend the plant into a so-called 1+1+5 hot rolling mill.

The new hot rolling mill will be equipped with modern actuators and technological control systems. The five finishing stands will come with CVC® plus systems for strip flatness and strip profile control. All core components of the mill stands will be manufactured at the SMS Siemag workshop in Hilchenbach.

**Cold rolling mill for automotive sheets.** This will be the fourth cold rolling mill SMS Siemag has supplied to Shandong Nanshan. While the three-stand tandem mill was a novelty in China last year, the new single-stand mill is another distinctive facility, since it helps give the aluminum strip the specific surface properties that are important for further processing in the automotive industry. The cold rolling mill is of six-high design and equipped with CVC® plus technology. It is able to roll extremely wide strip of up to 2,650 millimeters from starting gages of up to 7.5 millimeters to final gages as thin as 0.2 millimeter. The main task of the mill is to roll the aluminum strip in reducing passes to the demanded final thickness. For special automotive grades, the last pass can be performed as skin-passing operation. This serves to give the strip surface a predefined roughness which is needed later on to meet the high requirements of the automotive industry on car-body parts.

In addition to the proven plant equipment made by SMS Siemag, such as CVC® plus intermediate roll shifting system, work and intermediate roll bending system, multi-zone cooling with HES (Hot Edge Spray System) system and DS (Dry Strip) system, the cold mill will come with two further innovative technologies to ensure a convincing skin-passing result. So-called EDT rolls will be used for skin-passing. EDT means Electro Discharge Texturing and denominates a method of roughing the roll surface by means of spark erosion. Thus, the rolls are provided with a special texture that is transferred to the strip surface in the rolling process.

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For controlled application of the low rolling forces usual in skin-passing operations, SMS Siemag will equip the aluminum cold rolling mill with an Enhanced Bending System (EBS) made by SMS. This system has been successfully used for skin-passing soft steel grades and will, for the first time, be integrated in an aluminum mill. The EBS lifts the top backup roll, and the required rolling force is provided solely by the intermediate roll bending system. This way, precise and careful skin-passing of the sensitive aluminum strip is possible.

A coil preparation station and a coil inspection line, connected to a pallet transport system for gentle transport of the aluminum coils, all required media systems, MultiPlate® filters and an SMS Siemag Airwash™ exhaust air filter system that is suited for future connection of another cold rolling mill and which has a total exhausting capacity of 370,000 cubic meters per hour, complete the cold mill stand. The cold rolling mill is designed for an annual production of more than 130,000 tons and is scheduled to roll the first strip by the end of 2014.
Henan Zhongfu Industrial Co. Ltd., China, rolled the first coil on its aluminum hot strip mill supplied by SMS Siemag. One month ahead of the contracted date and after a commissioning period of merely six weeks, the strip with a width of 1,330 millimeters and a final thickness of six millimeters left the mill in Gongyi in the province of Henan.

In the future, the new mill is to produce 760,000 tons per year of aluminum hot strip for a wide field of applications such as foils, packaging material, beverage cans, automobiles and façade panels as well as for the printing industry. The 1+4 hot rolling mill comprises a reversing roughing stand with edger and a four-stand finishing mill. To attain the desired strip quality, i.e. thickness and profile, the stands are equipped with hydraulic adjustment and multi-zone cooling systems, and in the finishing mill with CVC® plus technology, work and intermediate roll bending system. To ensure a high production rate, the entry section of the finishing mill is equipped with a preliminary strip cooling system to control the strip temperature of special products. Further main components of the plant are a light and a heavy crop shear, an exit-side group with trimming shear, coiler and coil transport system as well as the pertaining media systems for hydraulics, emulsion, lube oil, and fume exhausters.

Henan Zhongfu is impressed by how the project progressed. In a letter to SMS Siemag they said: “We hope to continue our excellent cooperation on more successful projects in the future.”

Technical data

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<th>1+4 hot rolling mill</th>
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<td>Commissioning</td>
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<td>Production</td>
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<tr>
<td>Strip width</td>
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<td>Strip thickness</td>
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SMS Siemag’s competence in the aluminum sector and the quality of its plants have convinced Henan Zhongfu. In addition to the 1+4 hot rolling mill, SMS Siemag will establish a two-stand tandem cold mill and a single-stand, six-high cold rolling mill in the Gongyi works complex. The cold rolling facilities are designed as six-high stands with CVC® plus technology, work and intermediate roll bending systems, multi-zone cooling, hot edge spray, and dry strip systems.

Happy faces after successful commissioning.
An eye on safety

With products from SMS Siemag, customers are on the safe side

Protective shielding makes for a safe production process.

User-friendly concepts and ergonomic design developed in coordination with the customer.

The safety modules from the areas of mechanical engineering, fluids as well as electrics and automation all bear the same handwriting.
SMS Siemag has been adopting a competent and exemplary approach to product safety. The safety concept for the plants to be commissioned takes into account all laws and provisions set out in the applicable European safety standards.

Together with their customers, SMS Siemag devises practicable solutions in which the safety-relevant control functions are implemented separately from the machine controls. Thus, the safety concept combines a maximum of safety with useful possibilities of monitoring the production process. Moreover, the safety-relevant control functions are already thoroughly checked beforehand as part of the Plug & Work procedure.

Although at EU level many legal provisions concerning product safety have been largely harmonized, within and especially outside Europe, specific national rules governing aspects of product safety must be observed. SMS Siemag’s activities in the field of product safety are as wide-ranging as to include the implementation of regulatory requirements and voluntary commitments, such as the standardization of SMS products in European working committees, as well as sustainable product development.

Risk assessment and safety concepts. In order to be able to sell safe products on the market, risk assessments and safety concepts resulting from such assessments must be given high priority. To minimize risks, SMS Siemag subjects its products to a risk assessment as early as in the research and development stage. This includes tests aimed at identifying potential hazards regarding the products. The fact that all technical departments, from mechanical and hydraulic engineering through to electrics and automation, act together offers our customers a decisive advantage: all modules of the safety concept bear the same handwriting.

Providing practice-oriented instructions and customer training as well as guidance on specific issues makes it possible to identify and minimize potential risks and provide the pre-conditions for a smooth process.

By choosing SMS Siemag products, customers obtain the following safety-related benefits:
- A uniform safety concept throughout the entire life cycle of their machines and equipment
- Concerted activities by all technical departments of SMS Siemag, in cooperation with the customer
- Constant improvement of product safety through the development of internal standards and participation in external bodies

Awareness of the safety of products. User-friendly concepts and ergonomic design are a matter of course for SMS Siemag. The company constantly improves the safety of its products through proactive action. Regular audits assess SMS Siemag’s conformity with product safety standards. Every employee whose work may affect product safety is trained to act according to the corporate-wide principles of product safety and the related procedures, instructions and guidelines.
SMS Siemag was granted the final acceptance certificate by Severstal Columbus, U.S.A., within a period of less than one year after production of the first coil. The line is designed for the uncoiling, leveling, pickling, side-trimming and recoiling of hot strip up to a width of 1,880 millimeters.

The strips, which may be up to 12.7 millimeters thick, are processed in a discontinuous mode at a maximum speed of 152 meters per minute. The line has an annual capacity of 540,000 tons of steel strip, with the material mix including mild deep-drawing grades, IF steels as well as modern high-strength steels.

Flexible production

The discontinuous mode of production provides the advantage of being highly flexible in respect of production planning and use of materials, and furthermore facilitates the processing of thick strips. The geometric dimensions and grades of the strips to follow need not be considered in production planning as the strip ends are not welded together. Thus it is possible to process steel grades that can either not be welded at all or are difficult to weld. Due to the horizontal strip run without bends, very thick strip can be processed regardless of the usual bending losses. Hence, the line not only increases the pickling capacity of Severstal Columbus, but also enhances its product range and enables the company to flexibly respond to its customers’ demands.

Stitcher and tension leveler

Strips with a thickness of less than two millimeters are joined by a stitcher in the entry section and processed in a semi-continuous mode. Also arranged in the entry section of the line is a tension leveler that is used when processing strip gages of up to 6.35 millimeters. It improves the strip flatness which in turn simplifies the subsequent pickling process.

Plastic tanks

A special feature of the line is the plastic tanks in the turbulence pickling section. Granite blocks fitted to the walls and the bottoms protect the tanks from mechanical wear. The advantages of plastic tanks are their light weight and easy installation.
Benefits from the turbulence technology in push-pull pickling lines:

1. The strip is guided through a fully closed, flat granite channel. The V-shaped granite section ensures that also thin and mild steel strips are reliably conveyed during the pushing procedure. The heavy granite covers prevent the strip from buckling and assist the pushing operation.

2. The high turbulence in the narrow pickling channel intensifies the pickling process and shortens the time required for pickling. Since the turbulence pickling channel is completely filled with acid, the steel strip immerses in the medium all the way from the entry to the exit points.

3. The granite covers seal off the free evaporation surface, thus minimizing temperature and acid losses due to evaporation.

4. The hydrodynamic sealing reduces the acid quantities at the squeezer rolls to a minimum to prevent the escape of acid from the tank in this area.

The complete plant of Severstal Columbus was established by SMS Siemag.

Technical data

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<th>Commissioning</th>
<th>2011</th>
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<tr>
<td>Production</td>
<td>540,000 tpy</td>
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<td>Strip width up to</td>
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<tr>
<td>Strip thickness</td>
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<td>Process speed</td>
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<tr>
<td>Steel grades</td>
<td>CQ, DQ, DDQ, EDDQ, HSLA, IF, HSS</td>
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MMK, Russia

Final acceptance of cold strip lines

➤ Commissioning | At the end of November 2012, MMK (Magnitogorsk Iron and Steel Works), Russia, granted the final acceptance certificate for the cold-strip finishing lines supplied by SMS Siemag. All in all, more than one million tons per year of high-grade steel strips are produced here, especially for the production of external and internal car parts. On behalf of MMK, SMS Siemag erected one pure hot-dip galvanizing line and one universal annealing and hot-dip galvanizing line.

This very flexible plant concept handles a wide range of materials and satisfies high quality demands. The complete lines, from mechanical and hydraulic equipment via furnace technology and air knife systems up to post-treatment facilities, were supplied from a single source. SMS Siemag was furthermore responsible for the electrics and automation systems. One million tons of premium cold strip can be finished on both lines annually.
1. The strip enters the line from two payoff reels in alternating order.

2. A total of three vertical loopers bridge the interruptions in the strip run and safeguard continuous production.

3. The lines of MMK are equipped with a preliminary cleaning section upstream the entry-side looper and a main cleaning section in front of the furnace to make sure the looper rolls are not contaminated and the strip surfaces are free from any dirt particles when entering the process section. This meets the highest demands on surface quality.

4. In accordance with a defined annealing curve, the strip is efficiently annealed in the Drever radiant tube furnace and then specifically cooled at high rates by the ultra-fast cooling system.
5. FOEN air knives set the thickness of the zinc layer and a DEMCO system ensures a highly stable and smooth strip flow without movements.

6. The universal annealing and hot-dip galvanizing line can be operated in two modes. In the hot-dip galvanizing mode, the strip runs from the zinc pot directly to the cooling zone. When annealed material is produced, the strip is fed from the annealing furnace through a channel between zinc pot and cooling zone to the overaging zone.
7. The strip is rolled on a four-high skin-passing mill stand with work-roll bending system which also serves for setting the surface roughness.

8. Strip flatness is accomplished by the tension leveler.

9. In the roll coater, the strip is chromated, passivated or coated with a so-called anti-finger-print layer. Pickup roll and applicator roll serve for uniform and precise application.
10. A trimming shear sets the desired strip width and straightens the strip edges.

11. The quality of the strip surface is controlled in the inspection stand.

12. Exit side of the line with DUMA-BANDZINK oiling machine and flying crank shear as well as two tension reel groups.
13. The coiling process is supported by a belt wrapper.

Sergei Laskov (left), Rolling Mill Manager at MMK, and Frank Glöckler (right), Project Director at SMS Siemag, with a galvanized coil.

All process-relevant information converges in the control stand. The clearly arranged HMI (Human Machine Interface) allows the operators easy and intuitive control of the production process.
New development | In the combined annealing and galvanizing line that SMS Siemag is establishing on behalf of Hyundai Hysco in South Korea, a newly developed trimming shear unit will be installed and commissioned still this year. The unit is equipped with a retractable scrap cutter that is able to cut even high-strength material up to a tensile strength of up to 1,180 MN. Other advantages are the lower investment and operational costs as just one scrap press is needed to handle the total amount of edge scrap.

Straight strip edges. The trimming shear serves to correct the strip edges and to set the demanded strip width by the circular knives separating a five to 40-millimeter wide edge from both strip sides. The thickness of the strips may vary from 0.3 to 2.3 millimeters, while the strip speed may reach up to 800 meters per minute.

Flexible edge scrap processing. After cutting, the edge scrap must be safely removed from the line. In the case of thin and soft strips, the material is guided through a channel to the scrap press which cuts the edges during the compacting operation. When thick and high-strength material is to be scrapped, an edge scrap cutter is moved into the line downstream the circular knives and cuts the scrap into pieces of approximately nine centimeters, which are then directed to the scrap press. This enables problem-free trimming of thick and high-strength material.

One scrap press for both strip edges. The scrap press built for Hyundai Hysco is a new development that compacts up to eight tons of edge scrap into cubes and pushes them into a container. Due to its great capacity, the press can process the scrap of both strip sides. Thus, the expenses for material and manufacture as well as for the hydraulic pump station are almost half of that required for the alternative with two presses. Additionally, the maintenance work required when changing the wear parts is significantly reduced. In the course of designing the machine, the distribution of forces in the base frame was optimized with the aid of an FEM analysis to prevent deformations during operation. The new design furthermore contributed to easier installation and setting.

Contact: strip.processing@sms-siemag.com
New order | The Turkish steelmaker Erdemir (Eregli Iron and Steel Works Company) placed an order with Fontaine Engineering und Maschinen GmbH (FOEN) covering the supply of an air knife system which will be integrated into an existing hot-dip galvanizing line within a short downtime period in late summer of 2013. The purpose of the modernization is to achieve top surface qualities for the automotive industry and at the same time to boost the capacity of the line. In addition to the automobile sector, the galvanized plates and sheets will also be used in the construction and household appliances industries.

Extremely short delivery time. The period from order signing to installation will take less than 13 months. The whole project will be finished at the end of 2013. The complete air knife system will be manufactured and assembled by FOEN in Langenfeld, Germany. The scope of supplies includes erection supervision on site as well as commissioning. In the run-up phase, Fontaine furthermore delegated a galvanizing specialist to identify general points in need of improvement. The line will be optimized to the effect of attaining the best possible product quality with the new air knife system.

In the hot-dip galvanizing line, the air knives are installed directly above the zinc pot. The strip leaves the zinc pot in a vertical upward direction and drags along molten zinc in quantities that depend on speed and surface property. Excess zinc is wiped off by the air knives so that the zinc layer has the desired thickness over the entire strip width. The air knives blow air to both strip sides through a very fine gap with a specific pressure. Depending on the preset pressure and the distance to the strip, it is possible to adjust the thickness of the coating. For this purpose, the system is equipped with an automatic control. A highlight is the reinforced bottom roll arms and the crossbars which serve to ensure an extremely smooth strip run and to stabilize the system.

Contact: info@foen-gmbh.de

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Erdemir orders
FOEN air knife system
Improved quality while increasing capacity

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<td>Process speed</td>
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<td>Products</td>
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Air knives for Segal
Higher productivity

Segal SA, domiciled in Ivoz-Ramet, Belgium, awarded DUMA-BANDZINK GmbH the order to supply four new air knives including all ancillary equipment such as spare knife lips, air generating system, assembly stand and deposition racks. The new air knives will be integrated into the existing production line for GI and GA steel grades in the company’s works in Ivoz-Ramet. The intention underlying Segal's decision to use air knives is to increase productivity and quality and at the same time to reduce the consumption of power and nitrogen.

Ruukki Metals Oy, Finland
New mandrels for continuous pickling line

The continuous pickling line at Ruukki Metals Oy in Hämeenlinna, Finland, was equipped with new mandrels to coil high-strength steel strips. Due to many failures of the existing roll wrappers at the exit side of the pickling line, Ruukki decided to replace them by new slotted mandrels. The project was executed in cooperation with DUMA-BANDZINK GmbH in two steps.

The first part of the task, covering the area of coiler No. 2, was implemented in December 2011. The replacement was performed while the line was running. The implementation of the second part, in coiler No.1 area, was carried out during the summer overhaul in July 2012. Both steps included new mandrels for the existing coilers as well as auxiliary equipment for threading the strip head and tail ends in and out. New hydraulic valve stands for both mandrels were also part of the project and were supplied by DUMA-BANDZINK. “It’s always challenging to add new equipment to an existing old line, but due to the careful preliminary planning and good cooperation with DUMA-BANDZINK everything went well and the line was back in production right on time,” says Mika Inkanen, Project Manager at Ruukki Metals Oy. After this modernization, Ruukki is able to coil higher-strength strips with up to 800 megapascals (yield strength) and a thickness of up to 6.5 millimeters.
DUMA-BANDZINK on schedule
Modernization of galvanizing-line air knife sets

In summer 2012, DUMA-BANDZINK GmbH modernized the air knife sets of galvanizing line VZA 1 at ArcelorMittal’s works in Eisenhüttenstadt, Germany. The first step taken by DUMA-BANDZINK was to renew the electrical plugs including cables and cable ducts at air knife sets Nos. 1 and 2, the second one to modernize the mechanical angle adjustment at air knife set No. 2. The purpose of these measures was to increase the availability of the plant and furthermore to simplify air-knife changing operations.

Three weeks before the scheduled plant downtime in July 2012, air knife set No. 2 arrived at the location of DUMA-BANDZINK. The contracted mechanical and electrical services for the conversion were rendered within that period so that air knife set No. 2 could be returned to ArcelorMittal in due time for the plant shutdown and then be installed. Thus it was possible to meet the scheduled date for production restart on July 23, 2012.

Thereafter, conversion work at the electrical systems of air knife set No. 1 was carried through. The set was commissioned ten days later during a six-hour downtime.

Record breaking
275 electrostatic oiling machines

In December 2012, DUMA-BANDZINK GmbH was awarded the order to supply two electrostatic oiling machines, i.e. one of standard and the other of DOS design. This order represents the 275th machine of this kind to be supplied by the company. A success story. The first electrostatic oiling machine was supplied to Thyssen in 1982. Oiling machines are used in strip processing lines in the steel and aluminum industries. All strip widths of common usage at present (600 to 2,400 millimeters) can be reliably oiled by the DUMA-BANDZINK machines which apply film weights of 0.5 to 20.0 mg/m² for DOS machines and of 0.5 to 3.0 g/m² for the standard version.

Since 1982, DUMA-BANDZINK has sold 275 electrostatic oiling machines.

Contact: info@duma-bandzink.com
Seven lines on stream

180,000 tons of GO electrical steel strip

This strip (also referred to as silicon steel strip) substantially contributes to the energy efficiency of electrical systems. Energy-efficient transformers require, among other things, grain-oriented electrical sheets with very low core losses. The production process is a complex one as the grains must be aligned, with little room left for misorientation, according to the direction of rolling. This is especially true for the highly permeable material which can be produced on these lines in addition to the conventional grain-oriented electrical steel strip.

Main process steps. In the customer’s works, the hot strip is initially annealed and descaled in two annealing and pickling lines that are capable of processing grain-oriented and also non-grain-oriented grades. The cold rolling process is followed by recrystallization and decarburization in three decarburizing and coating lines which also serve to apply a layer of magnesium oxide to the strips to prevent them from sticking to each other during the subsequent long-term high-temperature treatment needed for metallurgical reasons. Together with an insulation varnish, this serves to set up inherent stresses and hence improve the magnetic properties. Two flattening and coating lines were established for final thermal leveling and for the application of an insulation coating.

Erection of the lines was started at the beginning of 2011 and finished in January 2013, when decarburizing and coating line No. 3 was put on stream.

Technical highlights. Among other things, all lines are equipped with horizontal loopers, including strip trolleys which permanently support the strip and thus help prevent damage to the strip surface. Furthermore, the deflector rolls feature specifically adjusted diameters to prevent mechanical loads on the strip. The annealing and pickling lines are provided with a strip edge heating system to avoid strip defects. Moreover, the turbulence pickling system has been adapted to meet the requirements imposed by silicon oxide sludge. The appropriate configuration of the basin interacting with suitable equipment in the circulation system ensures an almost automatic sludge removal.
In the decarburizing and coating lines, the coating with magnesium oxide has a considerable influence on the material properties of the final product. The roll coaters for electrical steel strip made by SMS Siemag are equipped with a precise and fully automated adjusting system for the coater rolls. The high quality of the coating is additionally ensured by precisely controlling the temperature of the coating medium in the circulation system. A special stitcher installed in these lines safely joins the high-strength electrical steel strip during short downtimes.

The flattening and coating lines are characterized by two special features, the first one being magnesium oxide pre-cleaning of the strip and the second one the pickling process for surface preparation prior to coating.

**Technical data**

**Annealing and picklings lines Nos. 1 & 2**
- Strip width: 730 to 1,350 mm
- Strip thickness: 1.5 to 3.0 mm
- Material: NGO, HGQ, CGO
- Strip speeds:
  - Ingoing: 80 m/min
  - Process: 55 m/min
  - Outgoing: 80 m/min
- Capacity: 240,000 tpy

**Flattening and coating lines Nos. 1 & 2**
- Strip width: 750 to 1,270 mm
- Strip thickness: 0.15 to 0.35 mm
- Material: HGQ, CGO
- Strip speeds:
  - Ingoing: 170 m/min
  - Process: 130 m/min
  - Outgoing: 170 m/min
- Capacity: 92,000 tpy

**Decarburizing and coating lines Nos. 1, 2 & 3**
- Strip width: 750 to 1,270 mm
- Strip thickness: 0.15 to 0.35 mm
- Material: HGQ, CGO
- Strip speeds:
  - Ingoing: 130 m/min
  - Process: 100 m/min
  - Outgoing: 130 m/min
- Capacity: 62,000 tpy

Contact: silicon.strip.processing@sms-siemag.com
Within a period of just four weeks, SMS Siemag, in cooperation with ThyssenKrupp, installed a GATV convection oven including regenerative post-combustion system and ancillary equipment in the coilcoating line (BBA) No. 3 at ThyssenKrupp Stahl, Eichen, Germany. Due to an intelligent heat and exhaust-air treatment system, the oven consumes about 30 percent less energy, yet simultaneously the oven performance is 20 percent higher. The air emission values are distinctly below the legal limits.
Coilcoating line. The line serves to provide steel strips with a lacquer or foil coating. The major part of the plates with a thickness ranging from 0.5 millimeters to three millimeters are used in the construction industry, for example as single-leaf trapezoidal sheets, heat-insulating sandwich elements or as garage door elements. Another field of application of the up to 1,750-millimeter-wide steel strips is in consumer durables such as washing machines, refrigerators, housings for lamps, aerosol cans and others. Apart from the aesthetic expectations regarding shade of color, brilliance and surface structure, the useful properties like surface wear resistance, formability and weatherproofness of the complete setup can be influenced by the targeted selection of the coating material. Through this approach in line with the slogan “finish first – fabricate later”, the products can be manufactured in a resource-saving and eco-friendly manner.

At first, the strip is provided with a passivation layer and a prime coat in the line. Thereafter, at a strip speed of 120 meters per minute, a roll coater applies a liquid coat of lacquer to the strip surface. This layer is subsequently heated in an oven for drying and polymerizing. During this procedure, the solvents contained in the lacquer evaporate and the lacquer molecules get linked. The emerging solvents must be collected and conditioned in the exhaust-air treatment system. As the share of solvent is very high, special precautions have to be made to prevent explosions.

Modernization. The old oven for drying the color coat was replaced by a new GATV catenary convection oven including complete airflow system. Instead of the two old thermal exhaust-air systems, a new regenerative post-combustion system was installed which cannot only treat the air exhausted from the new finishing oven, but also the air from the oven used for drying the prime coat. This means that the total volume of exhaust air is now conditioned by one cleaning system instead of two. The ventilation system of the coater house was improved as well. The solvent-loaded exhaust air from the coater house is now also used to heat the oven. In the thermal area, electrics were renewed to boost the degree of automation.

Cont’d on next page
Conversion within four weeks. The time available to SMS Siemag as system supplier and its participating partners until completion of the conversion work was just four weeks. The order for the modernization had been awarded in March 2011. From that moment on the new components were designed and manufactured, in particular the conversion including installation work was planned in detail in cooperation with ThyssenKrupp. Altogether 90 persons were employed on site in two shifts most of the time to perform the necessary conversion work at outside temperatures as low as minus ten degrees Celsius. On the first two days, the old finishing oven and the exhaust air systems including airflow equipment had to be removed before the foundations could be adapted. Thereafter, the six oven sections having a weight of twelve tons and a length of seven meters each were delivered, brought into the line, positioned, and connected. After installation of the prefabricated 50-ton regenerative post-combustion system, the air and media lines as well as all further components were mounted. Three weeks later, the first motors could be started and first functions tested.

Fast commissioning. Owing to the detailed planning and quick conversion work, ThyssenKrupp restarted operation of the plant on schedule after merely four weeks. To return to full production capacity and a high product quality within the shortest possible time, SMS Siemag implemented a new oven model which helped attain a more efficient ramp-up curve on the basis of the old plant parameters. Supported by this model, the plant could produce at full capacity after just one week.

GATV convection oven. In the catenary oven, the strip is uniformly heated over the entire 42-meter-long oven by convection. The upper and lower air streams in the oven sections are generated by one frequency-controlled turbine each. Thus it is possible to separately control the desired energy application to the strip to be dried for each individual oven zone. In addition, the whole air flow was aerodynamically improved in order to obtain an efficiency of 50 percent based on a uniform flow pattern. A volume of approx. 60,000 standard cubic meters of air per hour are circulating in the oven at a temperature between 300 and 400 degrees Celsius to heat the strip to the required temperature of maximum 270 degrees Celsius. The ovens are provided with energy from the efficient energy recovery system of the regenerative post-combustion system and from additional burners.
Regenerative post-combustion system. The solvent-loaded air is exhausted from the ovens and burnt by the Regenerative Thermal Oxidizer (RTO) at temperatures of up to 850 degrees Celsius. Due to the use of ceramic heat stores, an efficiency rate of 98 percent can be attained. Depending on the solvent content, the finish oven, too, can partly be operated without additional energy solely due to the efficient energy feedback. This so-called auto-thermal mode of operation is particularly energy-efficient and ensures high purity values in the vent stack. The residual carbon content in the exhaust gas is below ten milligrams per standard cubic meter while the required limit value is 20 milligrams per standard cubic meter. The share of carbon monoxide and nitrogen oxides is less than 50 milligrams per standard cubic meter with the required limit being 100 milligrams per standard cubic meter. The finish oven has been designed according to the requirements of the new European Standard EN 1539 and is the first coil coating oven accepted by TÜV (German Technical Inspection Authority) in conformity with this standard.

Conclusion. Thanks to the good cooperation between SMS Siemag and ThyssenKrupp, the plant could resume full production after a very short downtime. The holistic approach of ovens, exhaust air cleaning, energy recovery, airflow system and automation led to an increase in energy efficiency of 30 percent and a rise in oven capacity of 20 percent. Additionally, all legally required values for air pollution can be satisfied. SMS Siemag – Meeting your Expectations.

Contact: furnacetechnology@sms-siemag.com

Interview with Dr. Markus Rudack, Production Manager of ThyssenKrupp Steel Europe

Newsletter: Dr. Rudack, what are the benefits from the conversion?
Dr. Markus Rudack: The most important reason for this refurbishment was that we fell substantially below the legally specified limit values for environment protection and, additionally, the reduction in fuel consumption for the coil coating process. Another advantage is the control accuracy of the system which entails a considerable improvement in quality.

What convinced you most about the project?
Rudack: The overall concept of oven, airflow, energy recovery and oven model.

During the conversion activities, what impressed you in particular?
Rudack: The short period needed for the whole conversion, especially in view of the low outside temperatures and the fact that most of the time the production hall had to be left open. Sometimes, it was not even possible to perform welding work as a consequence of the temperatures. Nevertheless, this work was done within the short time available and finished without any accidents thanks to the good preparation and cooperation of all parties involved.
New order | SMS Logistiksysteme is to supply to Nanshan Aluminium Co. Ltd. a turnkey high-bay store and coil transport systems for 32-ton aluminum coils. Commissioning of the facilities is scheduled for the end of 2014.

Nanshan Aluminium belongs to the Nanshan Group which is one of the leading aluminum producers in China. The company is constructing a completely new greenfield aluminum works close to the sea near Longkou City in the province of Shandong, in order to satisfy the demand of the growing Chinese aircraft industry for aluminum products.

With this order, which is the third one after 2004 and 2010, Nanshan Aluminium is relying again on the competence of SMS Logistiksysteme as a supplier of high-bay stores. Just as they did two years ago, the customer again ordered a turnkey solution. SMS Logistiksysteme will be responsible not only for supply and installation of the transport systems, but also for the complete engineering and construction of the high-bay store from finished floor level.

The centrally located high-bay store serves for interim storage of the aluminum coils leaving the hot and cold rolling mills. Three stacker cranes take care of fast storage and retrieval. Hot-rolled coils are subjected to a controlled cooling in the store for the purpose of minimizing their length of stay. The coils are carried to the downstream annealing furnace and further transfer stations outside the store by means of three coil cars, whereas coil transport to the finishing lines is accomplished by two driverless Automatic Coil Transporters (A.C.T.®). SMS Logistiksysteme will furthermore supply the complete automation for all facilities including logistics software and the warehouse management system.

Having a length of 294 meters and a height of 31.4 meters, the high-bay store can accommodate about 1,382 aluminum coils. All storage places will be designed for 32-ton coils with an outer diameter of 2,800 millimeters.
Second high-bay store near commissioning

In August 2010, Shandong Nanshan Aluminium Company for the first time placed an order with SMS Logistiksysteme covering a turnkey high-bay store including the complete transport logistics and automation system. The commissioning of the facilities will be finished by May 2013.

At the end of 2012, the two stacker cranes were placed in the rack system and installed. This was done with the aid of two heavy-load crane trucks. The stacker cranes were partly pre-assembled and required just five main components to be moved: shifting frame, two masts, top cross-beam, and hoist unit. The shifting frames had been positioned on the rails previously.

Contact: info@sms-logistics.com
www.sms-logistiksysteme.com

SMS Logistiksysteme GmbH, a company of the SMS group, implements customized logistics and service solutions for the steel, aluminum, and NF-metals industries. The company employs 120 people and continually strives to satisfy the complex requirements of its customers and to optimize production processes. The range of supplies and services covers the complete spectrum of transport, storage, and packaging logistics. Customers are supported from the initial planning stages right through to after-sales service. With branches, sales offices and authorized representatives around the world, SMS Logistiksysteme is internationally represented and within reach virtually all over the world.

The road on the premises of Nanshan Aluminium leads to an impressing statue of Buddha.
High efficiency and less energy consumption

SMS Concast receives order from El Marakby Steel

➤ **New order** | SMS Concast will supply an electric arc furnace to long-steel producer El Marakby Steel in Gizeh, Egypt. This furnace – the first EAF to be operated by El Marakby Steel – will have a capacity of 350,000 tons per year. It will help El Marakby broaden its portfolio and strengthen the company’s competitiveness.

The new meltshop will supply El Marakby’s rebar mill with 130-millimeter square billets. The rolling mill has an annual capacity of 240,000 tons. Excess billet output will be sold to the open market. The extremely poor energy supply in Egypt poses a major challenge to the billet production process. The electric arc furnace from SMS Concast will feature recovery technology that complies with the most stringent environmental regulations and will contribute to the efficient use of resources in steel production.

“We have had a political revolution. It is normal that there are problems in the aftermath,” says Mohamed Ismael Saad El Marakby, Chairman and CEO of El Marakby Steel. “To survive, rerollers must be integrated to create more added value. With SMS Concast, we have found a true partner to further develop our business.”

Charge material for the new furnace of El Marakby Steel will be scrap from the U.S.A. and Europe. It will also be possible to charge the furnace with up to 20 percent of scrap substitutes. Commissioning of the new furnace is scheduled to take place at the end of 2013.

Contact: [www.sms-concast.com](http://www.sms-concast.com)
Gerda Siderperú, Peru

Two new casting formats expand product range

Tests with new square billet formats were performed to the customer’s satisfaction

Gerda Siderperú has praised the recent project and commissioning activities of SMS Concast at its works in Chimbote in the north of Peru. The activities involved the supply of equipment for and the successful implementation of two new casting formats, namely 130-millimeter and 180-millimeter square billets. Equipment commissioning for the new formats took place in January 2013. Siderperú is now casting three of four formats with CONVEX Technology® mold tubes. Gerda Siderperú is situated right on the famous Pan-American Highway. The plant makes a wide range of products, from rebar through to high-carbon steels. Amongst Concast employees, the plant is known to be very clean and well maintained. The now upgraded continuous casting machine was originally built in the mid-1990s by a U.S. company. Even after having undergone several modernization projects, the four-strand plant still needs further revamping.

From the three most recent projects, a trustful relationship has evolved between Gerda Siderperú and SMS Concast. Meanwhile, new inquiries about further modernization packages have been received, for example for a new oscillator, mold level measuring equipment, mold lubrication system and new final electro-magnetic stirrers (FEMS). Thus we are likely to come across the name Gerda Siderperú more often in the near future.

Republic Steel, U.S.A.

More flexibility and efficiency with new EAF

New order | Republic Steel, based in Cleveland, Ohio, U.S.A., has awarded SMS Concast the order to supply a 150-ton electric arc furnace and the associated process equipment. The EAF will be installed in Lorain, Ohio.

“The expansion of our production capacity will enable us to maintain our position as market leader in the field of SBQ production. The additional capacity provided by the new furnace makes us more flexible and more efficient in delivering to our customers the high-grade technological products that they expect,” comments Jaime Vigil, Managing Director of Republic Steel.

The new furnace will raise the company’s annual production of liquid steel by 1.2 million tons. The EAF will have a heat size of 150 tons and a 120/135-MVA transformer, and feature eccentric bottom tapping equipment and oxyfuel burners. The new furnace will supply steel to Republic Steel’s bloom and billet casting plants. The cast products will be used to make SBQ products, including bar coil, in diameters from 7.5 to 165 millimeters and seamless tubes in diameters of 152, 280, 305 and 355 millimeters. Republic Steel will tap the first furnace heat in the second quarter of 2013.
From four inches to 20 inches

**Ten years of success with PQF®**

PQF® – a seal of quality from SMS Meer. Today these plants are in operation all the way from South Africa to the Middle East right through China.

SMS Meer has more than 125 years experience in producing seamless tubes. Its roots go back to the year 1885, when the brothers Reinhard and Max Mannesmann received their first patent for the production of seamless tubes. Together with Mannesmann, SMS Meer developed the first piercing and pilger mills.
## Global PQF® mills from SMS Meer

<table>
<thead>
<tr>
<th>Customer</th>
<th>Size</th>
<th>Year of order</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPCO</td>
<td>6 ⅛&quot;</td>
<td>2001</td>
</tr>
<tr>
<td>TPCO</td>
<td>18&quot;</td>
<td>2005</td>
</tr>
<tr>
<td>BMZ</td>
<td>6 ⅛&quot;</td>
<td>2005</td>
</tr>
<tr>
<td>TMK Tagmet</td>
<td>10 ⅛&quot;</td>
<td>2006</td>
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<tr>
<td>Jindal Saw</td>
<td>7&quot;</td>
<td>2006</td>
</tr>
<tr>
<td>ISMT</td>
<td>6 ⅛&quot;</td>
<td>2006</td>
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<tr>
<td>TPCO</td>
<td>9 ⅛&quot;</td>
<td>2006</td>
</tr>
<tr>
<td>Angang New Iron and Steel</td>
<td>7&quot;</td>
<td>2006</td>
</tr>
<tr>
<td>Anhui Tianda Oil Pipe</td>
<td>10 ⅛&quot;</td>
<td>2007</td>
</tr>
<tr>
<td>Vallourec &amp; Sumitomo</td>
<td>16&quot;</td>
<td>2007</td>
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<tr>
<td>Yantai Baosteel</td>
<td>18&quot;</td>
<td>2008</td>
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<tr>
<td>Jiangsu Xigang Group</td>
<td>10 ⅛&quot;</td>
<td>2008</td>
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<tr>
<td>Tenaris Tamsa</td>
<td>7&quot;</td>
<td>2008</td>
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<tr>
<td>Tianjin Tianxin</td>
<td>14&quot;</td>
<td>2008</td>
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<tr>
<td>V&amp;M Riesa</td>
<td>4&quot;</td>
<td>2008</td>
</tr>
<tr>
<td>ArcelorMittal Tubular</td>
<td>16&quot;</td>
<td>2009</td>
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<tr>
<td>Products Jubail</td>
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<tr>
<td>Baotou Steel (Group)</td>
<td>18&quot;</td>
<td>2009</td>
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<tr>
<td>Baotou Steel (Group)</td>
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<td>Jiangsu Tianhuai Pipe</td>
<td>20&quot;</td>
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<td>Hengyang Valin Steel Tube</td>
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<td>2010</td>
</tr>
<tr>
<td>TPCO</td>
<td>10 ⅛&quot;</td>
<td>2012</td>
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</table>
Until today, SMS Meer has been developing the technologies for seamless tube production. The current stage of evolution is the PQF® technology (Premium Quality Finishing). Since 2001, SMS Meer supplied 21 PQF® mills worldwide. In the meantime, the term "PQF® tubes" has become a synonym of quality. The reasons for the success come from constantly increasing demands which have to be met by seamless tubes today.

Tubes for oil and natural gas extraction

PQF® tubes are primarily used for the exploitation of oil and natural gas deposits and in the energy sector. Since ever deeper deposits are being exploited the tubes must feature higher load limits and improved corrosion properties. PQF® seamless tubes of high-alloyed steels fulfill these demanding requirements.

For example, the second-largest oilfield of all time named “Lula” lies off the Brazilian coast. Eight billion barrels of crude oil are to be delivered here from a depth of up to seven kilometers. Due to an excellent and reliable tube quality, tube manufacturer Vallourec & Sumitomo Tubos do Brasil has therefore opted for a PQF® mill from SMS Meer.

“The companies of the SMS group are very reliable partners. For our quality requirements we have found the best possible supplier and the colleagues from SMS have cooperated with us side by side even during the construction phase of the plant. That is exactly what I expect from a good business partner,” says Christiano Caldeira of Vallourec & Sumitomo Tubos do Brasil.

Plants for 4” to 20” in successful operation

China was and is a large market for PQF® plants. The Baotou Steel Group operates two PQF® mills and customer TPCO has already built four PQF® plants from SMS Meer. Hence, a size range of 5 1/2”, 6 5/8”, 9 5/8” and 18” is covered.

The extent of flexibility and upgradability of the PQF® technology is illustrated by the example of Anhui Tianda Oil Pipe, also in China. By upgrading 12 PQF® stands, the customer will expand the spectrum of sizes of its existing PQF® plant from 10 1/2” to 13 3/8”. Why the company has opted for the innovative technology of SMS Meer is summarized by Zhang Huming of Anhui Tianda Oil Pipe Company thus:

“Permanent innovations make SMS Meer so special and new solu-
tions open up better market opportunities for us. With our state-of-the-art PQF® plant from SMS Meer we are able to produce up to 500,000 tons of seamless tubes per year – economically and in the highest quality.\\n
Meanwhile, 21 PQF® plants from SMS Meer are in operation or nearing completion around the globe with maximum tube dimensions of 4” to 20”.\\n
A 20” plant is in operation at Jiangsu Tianhuai Pipe, a Chinese consortium of Tianjin Pipe Corporation (TPCO) and Jiangsu Shagang Group Huaigang Special Steel Company.

Owing to large maximum diameters, PQF® seamless tubes can now be manufactured which could only be produced up to now by means of other seamless tube manufacturing processes of poorer quality. This modern plant, utilizing for the first time the qualitative benefits of the PQF® technology in a new large tube dimension, achieves an annual capacity of 500,000 tons.

Trendsetting and sustainable technology

Whether high-alloyed steels or particularly thin-walled precision tubes – with PQF® technology manufacturers produce high-end products efficiently and reliably. PQF® mills need less material than conventional rolling mills, achieve a better yield, reduce tool costs and save valuable energy due to less reheat demand during the rolling process. In this way, PQF® mills fulfill the criteria for “ecoplants” – that is the sustainability concept of SMS Meer considering economical as well as ecological factors.

A PQF® mill consists of up to six stands with three driven rolls each. Force is thus more evenly applied over the roll circumference compared to a conventional arrangement with two rolls. Each roll has its own hydraulic adjustment. In this way, tube manufacturers are able to precisely adjust the roll gap within fractions of a second. The advantage: smaller tolerance deviations in the roll gap, lower material stress and less serious influencing variables during the rolling process.

SMS Meer offers PQF® mills with various stand-changing concepts: in the proven ACO tunnel type (Axial Change-Over), in the LCO method (Lateral Change-Over) and as BCO design (Bilateral Change-Over). For tube mill operators the modern PQF® technology means: tube production is even more stable and easier to manage. Today, PQF® plants produce seamless tubes with diameters of 1/2” to 20” and wall thicknesses from two to over 40 millimeters. Depending on the production program, an annual capacity of more than 600,000 tons can be achieved.
Commissioning | After a construction period of about two years, Jiangsu Tianhuai Steel Pipe from the Jiangsu Province in eastern China has put the 20” PQF® tube mill for high-quality seamless steel tubes into operation and has rolled the first tube. The PQF® mill is the largest mandrel mill worldwide, able to produce seamless tubes with diameters of up to 508 millimeters. The plant’s production capacity is 500,000 tons per year.

Largest PQF® mill

Upgrade | Since 2007, Anhui Tianda Oil Pipe from the Chinese Anhui Province has successfully operated a PQF® plant from SMS Meer for the production of seamless tubes. In the past, the plant produced tubes up to an outside diameter of 10 3/4”. After its conversion by SMS Meer, Anhui Tianda Oil will be able to produce seamless tubes in future up to an outside diameter of 13”. Twelve new PQF® stands allow the production of larger outer diameters.

Tube production expanded

New order | TPCO America Corporation from Corpus Christi, Texas, U.S.A., has placed an order with SMS Meer, Germany, for the supply of a new 10 3/4” tube mill with PQF® rolling technology. The plant will produce Oil Country Tubular Goods (OCTG) for the crude oil and natural gas industry in the region. The customer decided in favor of the SMS Meer plant due to the high quality of the tubes and energy savings during production. It is already the fifth PQF® plant that SMS Meer will have supplied to TPCO.

Latest PQF® solution of SMS Meer convinces TPCO

“In the meantime, we have gained vast experience with the PQF® technology from SMS Meer and are very satisfied with the quality of the tubes, the productivity and the energy efficiency of the machines,” emphasized Mr. Zhang Chun Feng, Vice General Manager of the international purchasing company of TPCO.

Improved wall thickness tolerance

The highlight of this plant is the latest PQF® solution, the so-called PQF® BCO. BCO stands for Bilateral Change-Over, and besides short changing times this worldwide unique solution ensures further significant improvement of the wall thickness tolerance due to the design developed by SMS Meer. The PQF® mill is designed for a maximum capacity of 534,000 tons per year, with a maximum tube diameter of 273.1 millimeters. Core components of the plant are the cone-type piercer, the PQF® mill, the extracting mill and the sizing mill.
Changzhou ChangBao, China

Technology from SMS Meer

➤ Commissioning | Changzhou ChangBao from Changzhou, Jiangsu Province, China, has commissioned a new stretch-reducing mill including automation system from SMS Meer. The scope of supply also includes a CARTA® technology package and a KR III 25 CNC groove dressing machine.

The stretch-reducing mill operates with individual roll drive (SMS Meer Single Universal Drive). This means that each roll shaft is driven individually by an electric motor. Furthermore, SMS Meer has taken over project management, supervision of erection and commissioning and training of the operating personnel.

The stretch-reducing mill will be used to produce seamless tubes in the diameter range from 26.7 to 114.3 millimeters. The mill has an annual capacity of around 100,000 tons, allowing the production of heavy-walled tubes with small diameters from high-alloy steels. Unlike conventional stretch-reducing mills, an undesirable formation of an internal polygon does not take place. In this case, it refers to a wall thickness irregularity of hexagonal shape that occurs in particular in tubes with large wall thicknesses and small diameters. As with all wall thickness irregularities, internal polygonization also leads to an impairment of product quality.

New straightener for TenarisConfab

➤ New order | TenarisConfab S.A., Brazil, has ordered a mechanical expander with a newly developed straightener from SMS Meer, Germany, for its Pindamonhangaba pipe mill near São Paulo.

Expanding and straightening on one machine. The Advanced Geometry Technology – AGT® allows precise calibration and straightening of longitudinally welded pipes with small diameters and large wall thicknesses on one single machine. Such pipes are required for offshore pipelines laid in deep-sea waters. With AGT®, SMS Meer can offer a flexible and efficient solution for the straightening of large-diameter pipes that have been bent by heat input during SAW welding. For the first time, selective straightening of the pipes can be carried out in all directions during expanding, eliminating the need for downline pipe straightening equipment. Compared with solutions to date, the new development achieves a better straightening effect by overbending.

Furthermore, the load on the expander tool is minimized. The system is designed for pipe diameters up to 30°. For larger diameters the whole units can be separated from the machine. This also allows simple tool changing. TenarisConfab produces up to 450,000 tons of pipes per year.
Rolling speed of 120 meters per second

Wire rod mill with high productivity

Xilin Iron & Steel from Heilongjiang Province, China, is increasing its production capacities with a new high-speed wire rod mill from SMS Meer. The two-strand mill with ten-stand wire rod blocks achieves a rolling speed of 120 meters per second. The plant can produce one million tons of wire rod per year.

“Our high quality combined with the proximity to the Chinese market convinced Xilin Iron & Steel,” says Zuo-Guo Xiao, Managing Director of SMS Meer in China. The maximum rolling speed of 120 meters per second – corresponding to 432 kilometers per hour – makes high demands on the equipment and the process management. “Xilin Iron & Steel can depend on all the processes running stably and reliably, allowing high availability and productivity to be achieved,” adds Zuo-Guo Xiao.

Xilin Iron & Steel will make quality products for the Chinese market on the new wire rod mill such as C-steel, cold-heading grades, welding wires and spring steels in the size range from 5.5 to 20 millimeters in diameter.
New order | The Chinese company FuJian WuHang Stainless Steel from ChangLe City, Fujian Province, has placed an order with SMS Meer, Germany, for the supply of core equipment for the construction of a new stainless steel rolling mill. The mill will produce wire rod and bars in coils. The core facilities include a modern 3-roll PSM® (Precision Sizing Mill) with hydraulic roll adjustment performed under load which finish-rolls all final sizes from a diameter of 13 to 38 millimeters from a single-pass family. Furthermore, the PSM® also produces all the necessary initial cross-sections for the wire rod block. The scope of supply of the PSM® includes the automatic stand-changing system, the workshop for preparation of the stands and guides, and also the CARTA® system which provides the specific setting values depending on the product and dimension. All the finished products of the 3-roll PSM® sizing block are wound on a newly designed coiler ensuring top quality by producing scratch-free finished products, and optimum shaping, height and winding densities of the coils. Another core component is the wire-rod finishing block with MEERdrive® technology. The special feature of this facility is that each stand is individually driven by its own motor. The wire rod dimensions range from a diameter of five to 20 millimeters.

New order | The Chinese company Jiangsu ShenYuan Special Steel from Shenyuan, Jiangsu Province, has awarded an order to SMS Meer for the supply of the wire rod outlet of a special steel rolling mill. The mill has an annual production capacity of more than 180,000 tons and will roll top-quality stainless steels and high-grade valve steels.

The wire rod section consists of compact CL stands in H/V arrangement renowned for their especially high load-bearing capacity. Installed downstream are an eight-stand wire-rod finishing block, a pinch-roll unit and a loop laying head as well as the LCC® (Loop Cooling Conveyor). The LCC® is designed in such a way that the heated wire rod coils can be collected directly downstream of the laying head in order to subsequently feed them to an inline heat treatment system. Commissioning is scheduled for the end of 2013.
Nucor-Yamato Steel, U.S.A.

SMS Meer revamps section mill

➤ Modernization | Nucor-Yamato Steel in Blytheville, Arkansas, U.S.A., has placed an order with SMS Meer, Germany, for the modernization of its NYS No.1 section mill. SMS Meer is supplying the rolling mill equipment which will enable the rolling of wider sheet piling products.

The package from SMS Meer includes charging and discharging machines for the heating-up furnace, modern primary descaling equipment, a new BD 1 (Break Down) stand and three new CCS® (Compact Cartridge Stand) finishing stands. The core of the project is a new three-stand finishing train which replaces the existing universal finishing stand. In addition to the replaced stand, two more stands will be installed in order to provide the required passes for rolling wide sheet piles. All new finishing stands employ the CCS® design with hydraulic screwdown, adjustment under load and quick program change in only 20 minutes.

The finishing mill can be operated in two different ways: either in two-high mode for rolling structural shapes or as a universal edger for finish-rolling beams. The new stands of the CCS® type enable wide sheet pile production and contribute to increase the productivity and the quality of beam production. The existing BD 1 stand will be replaced by a new one with an increased screwdown range for large slabs as well as a higher screwdown speed and accuracy. New features such as breakaway cylinders for overload protection and rolling force measurement as well as high-strength holding flaps provide more advanced functionality and higher reliability compared to the existing stand.

Steel Dynamics, U.S.A.

High-quality SBQ products

➤ New order | Steel Dynamics (SDI) from Fort Wayne, Indiana, U.S.A., awarded a contract for a major expansion of the SBQ (Special Bar Quality) plant at its Pittsboro / Indiana works to SMS Meer. This upgrade is to integrate a roughing mill and a new three-roll PSM® (Precision Sizing Mill) into the facility. With this investment, the 5th biggest steel producer in the U.S.A. strengthens its market position: In future, SDI will be able to roll high-quality SBQ products in the small-diameter precision range.

“We wanted the most advanced three-roll sizing technology available in the market – that’s why we selected SMS Meer. With the PSM® we will be able to produce specialty bar qualities with the highest precision and maximum flexibility”, states Barry Schneider, Vice President and General Manager of SDI in Pittsboro. The PSM® is able to roll out of a single-pass family any steel grade and any size and ensures maximum availability of the rolling mill. The new roughing mill will be operated in semi-continuous mode, consisting of a two-high reversing mill followed by eight rigid housingless stands in H/V configuration which will feed the existing finishing mill. The advanced three-roll PSM® will finish all SBQ bars in the range of ¾ to three inches round.
Larger initial pass cross-section

Abinsk Electric Steel Works orders roughing stands

➤ New order | Abinsk Electric Steel Works from the Krasnodar Region, Russia, has placed an order with SMS Meer to upgrade its high-speed rebar rolling mill. With two new roughing stands, Abinsk will be able to roll larger square billets than to date.

So far Abinsk has fed its rolling mill with 130-mm square billets purchased from other suppliers. The two new roughing stands from SMS Meer will extend the range to 150-mm square billets which will be produced in Abinsk’s own new steel plant. Furthermore, the two new stands will increase the rolling mill’s productivity by two to three percent for 8- to 10-millimeter rebars.

With this investment, Abinsk wants to become the leading iron and steel producer in the Krasnodar Region. The company intends to also increase its production volumes and extend its product range. Abinsk’s high-speed rebar rolling mill was supplied and commissioned by SMS Meer in 2011. It operates with a rolling speed of 40 millimeter per second and reaches a monthly production of 47,000 tons. This amounts to more than 550,000 tons per year and exceeds the agreed nominal capacity by almost 10 percent. Commissioning of the new stands is scheduled for April 2013.

Round bars of high quality

Grinding line for Outokumpu VDM

➤ New order | VDM in Altena, Germany, is strengthening its position in the market and has therefore ordered a regulating-wheel grinder of the RSM 60 type with complete finishing section from SMS Meer, Germany. From May 2013, Outokumpu VDM will be able to produce up to 13-m long round bars of high quality in Altena.

High degree of automation. The regulating-wheel grinder from SMS Meer “pre- or finish-grinds” round bars of steel and NF metals in a single pass. The RSM 60 is of torsionally very rigid design, permits high cutting rates and has a high diameter tolerance. It easily grinds even high-strength bars and bars made of materials which are difficult to machine. The large working range of six to 125 millimeters in diameter and bar lengths up to 13 meters makes the material feeding a particular challenge: bundles of up to 100 bars have to be reliably separated and loaded into the machine, otherwise machine standstills are the consequence. SMS Meer solves the problem with a special step separation system.

In future, Outokumpu VDM will monitor the sophisticated processes on the new machine with a high degree of automation: machine control, process monitoring and diameter control as well as the linkage to the PDA system all form part of the order. The supply is completed by systems for emulsion treatment and air extraction. SMS Meer also provides the complete assembly. The new grinding line is scheduled to go into operation in May 2013.
Increasing drawing line performance

Dongil Industries orders two-roll straightener

➤ **New order** | Dongil Industries from Pohang, South Korea, has placed an order with SMS Meer to replace an existing straightener with a WRP 40 BF two-roll straightening machine. The new machine will enable the company to produce bright steel with high-quality surfaces in future: Bar straightness is better than 0.35 mm/m with a surface roughness of under 5 µm.

The new straightener will be integrated into an existing KZ-RP IIIB/25 drawing line of the Schumag type built in 1989. Bright steel producer Dongil plans to relocate the drawing line to a newly acquired plant in the port city of Pohang where it will be modernized thereafter.

The height-adjustable WRP 40 BF two-roll straighteners with adjustable top roll are specially designed for use in high-speed drawings lines. They allow high straightening precision and consistently high surface qualities – even at high pass speeds. The WRP 40 BF selected for Dongil is designed for bar diameters of six to 40 millimeters at a straightening force of up to 220 kN.

“Quality alone is not enough for us. Apart from the optimized product quality, reliable project management is also important. SMS Meer ensures that the machine is installed and ready for operation on time,” says Jung-Moon, Factory Manager at Dongil.

The two-roll straightener enables the manufacture of top-quality bright steel bars.

➤ **New order** | Heinrich Geissler, a company of the GMH Group, has ordered a two-roll straightener for bright steel from SMS Meer. Heinrich Geissler will use the new machine to straighten round bars of solid steel with diameters up to 250 millimeters. To achieve this, the machine offers a straightening force of 8,000 kN. It will be supplied by SMS Meer together with the complete finishing equipment. “Our long-standing partner SMS Meer has already supplied numerous peeling and straightening machines to the GMH Group,” says Dr. Jean Frederic Castagnet, Technical Director at Heinrich Geissler. “With this new bright-steel straightener, we are now setting standards!” Commissioning is scheduled for June 2013.

Heinrich Geissler, Germany

SMS Meer provides large bright-steel straightening machine

Heinrich Geissler, a company of the GMH Group, has ordered a two-roll straightener for bright steel from SMS Meer. Heinrich Geissler will use the new machine to straighten round bars of solid steel with diameters up to 250 millimeters. To achieve this, the machine offers a straightening force of 8,000 kN. It will be supplied by SMS Meer together with the complete finishing equipment. “Our long-standing partner SMS Meer has already supplied numerous peeling and straightening machines to the GMH Group,” says Dr. Jean Frederic Castagnet, Technical Director at Heinrich Geissler. “With this new bright-steel straightener, we are now setting standards!” Commissioning is scheduled for June 2013.
New order | Stahl Judenburg, Austria, has again decided in favor of the technology from SMS Meer. The stainless steel specialist placed the second order with the company for manufacturing and supplying a BC 50 bright steel center.

The core elements of the center are the PM 1 peeling machine and a WRP 100 bar straightener. The new bright steel center can process bars with diameters from 15 to 55 millimeters and lengths from 2,500 to 7,000 millimeters. SMS Meer had already supplied a similar installation to Judenburg in 2006. “With SMS Meer we have found a reliable partner,” says Dr. Niels Vieweg, Technical Director at Stahl Judenburg. “The demands on quality and productivity in the bright steel industry are growing constantly. From SMS we get not only the equipment but also outstanding service. SMS Meer assists us with repairs and takes care of spare and wear parts. That ensures a consistent quality, and thus our success on the market.” Stahl Judenburg manufactures bars for the automotive industry on the bright steel center. In engine and plant engineering, the products are used as chrome-plated piston rods. The peeling machines of the PM series from SMS Meer cover a size range from 7 to 200 millimeters. In conjunction with a WRP straightening and polishing machine, very high demands on straightness and surface finish can be satisfied. To date, SMS Meer has delivered 26 machines worldwide.

New order | The Chinese company Huitong Jincheng Precision Metal Manufacturing near Shanghai has ordered six drawing machines from SMS Meer – two with integrated chamfering machines. With these machines, Huitong Jincheng aims to meet the high demand for bright steel products in China.

The six machines draw, cut and straighten the bars at a speed of 25 to 120 meters per minute, while the integrated chamfering machines finish the ends of up to 40 bars per minute. Maximum deviations for free-cutting and unalloyed steel are 0.2 millimeters per meter. Huitong Jincheng is thus able to meet the high demands of its customers from the electronics and automotive industry. “With the machines from SMS Meer, we can open up new market segments,” says Chih Hsiung, Deputy Managing Director of Huitong Jincheng. “We can profit from the good reputation of our supplier in the Asian region. When we tell our customers that we produce with SMS Meer equipment, they know that they can rely on our quality.”

A further advantage for Huitong Jincheng lies in the wide range of our products. The machines from SMS Meer produce round, square and hexagonal profiles, with each machine being designed for a different diameter. The finished products range from three to 22 millimeters.
SMS Meer is currently building several heavy extrusion presses for large profile applications. Two of these presses have a nominal pressing force of 150 MN and are considered to be the largest state-of-the-art front-loading presses in the world. Last year, a 150-MN extrusion press from SMS Meer was put into service at Yankuang Aluminium, China.

Pressing force up to 150 MN

Market for large extrusion presses continues to grow

Trend towards large presses

Large presses serve a market niche enabling the extrusion of large profiles for industrial applications, truck/trailer vehicle construction, as well as railroad coach construction, and aircraft applications. The market also differs enormously depending on the region of the world. For example, North American passenger transport is limited to commuter services in the big metropolitan areas only, while in Europe passenger service has a big market share. On the other hand, freight traffic by rail is very common in North America,
The number of presses launched onto the market is growing continuously.

Development of the high-speed network in the railroad sector. (Source: UIC)

while in Europe freight is transported mainly by road. Typical extrusions for the railroad sector are floor structures, roof components and sidewall profiles.

In China, Russia, India and Brazil you will find infrastructure programs that include new railroad lines. There are new high-speed and long-distance connections as well as investments for intercity, local/regional trains and metros. China alone intends to lay 20,000 kilometers of high-speed railroad tracks by 2020. The Russians recently started an investment program worth 7.5 billion euros for the construction of 11,000 kilometers of railroad tracks to be completed by 2030. Over the next 15 years the market for high-speed trains is thus expected to almost triple.

Benefits of larger and wider profiles

The way forward for today’s railroad coaches is an integrated body design, which means an assembly of several parallel full-length extrusions which are joined by friction stir-welding. Integrating two smaller profiles into one large section will eliminate one friction stir-welding operation, which costs between 800 to 1,000 euros per seam. An assembly group with fewer welded seams will also more easily fulfill the high quality requirements.

Extruded sections for the transportation market are characterized either by a high meter weight or by an extraordinary width. With the required extruded lengths of up to 27 meters – corresponding to the length of a railroad coach – heavy billet weights are required. While the billet diameter is more or less preset by the extrusion ratio, section width and the necessary specific pressure on the die set, the only possible variable to increase the billet weight is by extending the billet. The extrusion of long billets is a classic application for short-stroke presses, among which the front loader represents today’s most preferred solution.

A short prestressed press frame provides high stiffness. A combination of exact billet loading and upsetting in the press centerline is the best precondition for high-quality extruded profiles. While front-loading presses in the range up to 55 MN are widespread throughout the extrusion industry, the existing large presses in operation are rarely operated in front-loading mode.

Cont’d on next page
Investment backlog

Over the past 15 years, the market has not invested heavily in large presses. Several older standard presses of up to 100-MN pressing force were already in operation and had been modernized in order to meet the increasing market demand for railroad sections. Furthermore, there were highly outdated water-hydraulic extrusion presses which could only insufficiently keep up with the demands of railroad coach manufacturers. The consequence: an increasing market for large profiles but a shortage of efficient heavy presses. Over the last five years great investments have thus been made into extrusion plants for heavy and large sections – mainly in China.

The number of large presses in the market is rising continuously today. Also apparent is the rise in nominal force of the extrusion press. While a 65-MN press was considered a huge press at the end of the 1990s, many regard it nowadays as medium-sized. SMS Meer has already delivered several large presses.

Convincing: 150-MN pressing force

For Shandong Yankuang Light Alloy Company in Jining, Shandong Province, China, a pressing force of 150 MN was convincing. The light-metal press from SMS Meer went on stream at the end of last year. It consists of a main cylinder with an overall length of six meters and an inside diameter of 2.3 meter with a weight of more than 160 tons. The pressing force of the main cylinder is 130 MN. The counterplaten is a heavy-weight at 180 tons, featuring a width of 5.8 meters and a thickness of 2.6 meters.

The main platen is 2.8 meters thick and 5.8 meters wide. The giant container for the 150-MN extrusion press has a three-piece design with four-zone resistance heating system combined with two-zone air-cooling system. It weighs nearly 70 tons. The pump station provides twelve primary pumps. The main drive has a drive power of 2,400 kW and delivers 6,200 liters per minute. The huge hydraulic reservoir has a volume of 52,000 liters. The butt shear has a shear force of 8.7 MN, thus nearly the size of the smallest extrusion press.
within the product range of SMS Meer. The linear billet loader weighs 40 tons, loading billets from 540 to 800 millimeters in diameter, with a billet length of 2,000 millimeters, precisely to press center. The maximum billet weight is approx. 2.7 tons.

This 150-MN press is a double-function machine, i.e. it can also be used as a tube press with a piercer for the production of seamless tubes. The piercer retention force is 40 MN. A loose dummy block is normally used for tube production. A programmable manipulator traveling on the upper column of the press loads and unloads the loose dummy block and supports the butt end when cut. The mode of operation can also be applied for alloys difficult to extrude when the use of a loose dummy block is advantageous. The shipping weight of the extrusion press is 2,400 tons, while the heaviest component weighs about 200 tons.

This extrusion press shows what is possible with today’s machine technology and that SMS Meer is the right partner for large extrusion presses.

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Premiere for extrusion press maintenance workshop

How can an extrusion press be properly aligned by a staff member? How can a ram seal be replaced? How does a cylinder modification take place? These were but a few of the most important questions during the first maintenance workshop for extrusion presses.

At the SMS Meer location Bellefonte in Pennsylvania, U.S.A., 60 customers learned how to maintain their machines and prevent undesired plant downtimes. During the two-day workshop the participants worked on six stations (see pictures), where essential questions relating to extrusion presses were dealt with. Experts from SMS Meer explained the most important tricks and methods. The participants, above all, were given the opportunity to gain a better understanding for equipment and maintenance.
Yangzhou Baosheng Copper, China

320,000 tons of copper wire rod on Contirod® plant

➤ New order | Yangzhou Baosheng Copper Industry from Yangzhou, Jiangsu Province, China, has commissioned SMS Meer to supply a Contirod® plant to be set up in Baoying in the Jiangsu Province.

Baosheng is one of the largest cable manufacturers in China. The expanded production will enable Baosheng to be less dependent on wire rod suppliers. The Contirod® line consists of a gas-fired shaft furnace, a Hazelett twin-belt caster, a billet preparation station and a rolling mill with 14 individually driven roll stands as well as a cooling section, coiler and coil handling unit for automatic compaction, strapping and packing of finished wire rod coils. The new Contirod® line produces up to 320,000 tons of ETP copper wire rod (Electrolytic Tough Pitch) per year. The company uses more than half of the copper wire rod produced for its own cable manufacturing. The remainder is sold on the market as high-quality 8-mm ETP wire rod. Hua DZ, Technology Manager of Yangzhou Baosheng: “On the Chinese market, the wire rod from Contirod® plants has an excellent reputation. Production costs are low and energy efficiency of the plant is high. We have therefore opted for SMS Meer.” Variable-frequency motors of the rolling mills will, among others, thing its high energy efficiency. The casting capacity of the Contirod® plant is 48 tons per hour with a casting cross-section of 120 x 70 millimeters. The plant will go on stream in 2014.

A comparable Contirod® plant will be installed in China by SMS Meer for Yangzhou Baosheng Copper.

Casting and rolling plant

35 tons per hour

➤ New order | SMS Meer has been awarded an order from Ningbo Shimao Copper, Zhejiang Province, China, for the supply of a complete integrated casting and rolling line of the Contirod® type to produce copper wire rod. The company thereby strengthens its position in the copper business.

Ningbo Shimao is a Chinese manufacturer of grade A copper cathodes, copper wire rod and special copper cables. The Contirod® plant is destined for the new factory in the Bin Hai Industrial Zone near Yuhao, Zhejiang Province. The high-performance wire rod line is able to produce 225,000 tons per year of high-quality copper wire rod from cathodes. The Contirod® line is designed for a capacity of 35 tons per hour and is one of the larger plants of its type in China. The plant comprises a gas control system on the shaft furnace for melting copper cathodes, and a Hazelett twin-belt caster in modular design for casting cross-sections of 90 millimeters x 70 millimeters.

The line operates together with a highly flexible twelve-stand rolling mill. Thanks to a newly designed Lambda gas control system and the use of frequency-controlled drives for blowers and stands, this Contirod® plant with a fuel consumption of 300,000 kcal/t and 42 kW/t is one of the most economical and eco-friendly plants of its kind. Commissioning of the plant is scheduled for November 2013.
Boosting productivity

Aluminij d.d. Mostar orders line for belt-type ingot caster

In order to boost production and gain greater flexibility, Aluminij d.d. Mostar, Bosnia and Herzegovina, has placed an order with Hertwich Engineering, Austria, for the supply of a belt-type ingot casting line.

The line comprises a melting and casting furnace and an air-cooled belt-type ingot caster. It has a design capacity of ten tons of ingots per hour with a weight of seven to ten kilograms. The air-cooling system ensures that a high metal quality is achieved. In addition, high-silicon and other eutectic and hypereutectic alloys can also be efficiently cast. The downstream equipment includes automated stacking, packing and marking units. Commissioning is scheduled for the first quarter of 2013.

Melting furnace for Impol

Lower metal losses

Impol from Slovenska Bistrica, Slovenia, has placed an order with Hertwich Engineering, Austria, for the supply and erection of an Ecomelt scrap melting furnace of the PS-120 type with preheat shaft.

The Ecomelt furnace operates particularly economically when used for melting scraps containing organic substances: depending on the contamination, the gas consumption can be reduced down to 350 to 550 kWh/t and is thus far lower than for conventional melting furnaces.

Impol thus saves energy costs and decreases CO₂ emissions. In addition, the metal losses fall to well below three percent thanks to the use of the immersion melting process. Commissioning is scheduled for July 2013.

Contact: info@hertwich.com
Efficient and safe

**Rio Tinto Alcan puts homogenizing and sawing line into operation**

*Commissioning* | Hertwich Engineering, Austria, has handed over the first expansion phase of a homogenizing and sawing line to aluminum producer Rio Tinto Alcan in Hafnarfjörður, Iceland. With this investment, Rio Tinto Alcan Iceland will be able to produce top-quality billets.

When changing between standard and special alloys with different holding times, a special furnace design ensures high flexibility and throughput. The new plant complies with Rio Tinto Alcan’s eco-friendly operating policies and sets new standards in the fields of safety and energy efficiency.

The plant is designed for an annual capacity of 157,000 tons of standard alloys. The supply package comprises a linear ultrasonic test installation (UT), the preparation for retrofitting a helical UT and an upstream billet saw including specific scrap removal. Other supply items are an electrically heated continuous homogenizing furnace, a cooling station as well as a downstream packaging station. A robot is used for the first time to assemble the strapping machine with wooden planks which are placed in deposits for an entire shift and are then transferred by the robot to the strapping machine. Consequently, the strapping device operates fully automatically over the entire shift.

**Recycling volume increases**

**Ecomelt scrap melting furnace for Novelis**

*Commissioning* | Novelis Italia from Pieve, Italy, has received an Ecomelt scrap melting furnace of the PS-80 type with preheat shaft for its new casting line from Hertwich Engineering. The new furnace plant will increase the recycling rate at Novelis from 34 to 80 percent.

At temperatures below 650 degrees Celsius, a hot-air flow in the preheat shaft heats the aluminum scrap, thus minimizing the oxidation of the material. The Ecomelt furnaces operate particularly economically when used for melting scraps which contain organic substances. As a result, gas consumption is reduced to 400 kilowatt hours per ton, and is thus significantly below that of conventional melting furnaces. That saves energy costs and lowers the CO₂ emissions. In addition, the metal loss falls to below three percent thanks to the use of the immersion melting process. The Ecomelt furnace at Novelis went on stream in December 2012.
Modernization and production adaption

Forjasul orders EloForge™ induction heating plant

➤ New order | Forjasul Canoas from Rio Grande do Sul, Brazil, has placed an order with SMS Elotherm for the supply of an EloForge™ induction heating system. SMS Elotherm will integrate the system into Forjasul’s existing plant and customize the system precisely to the production requirements.

With a nominal power of 500 kilowatts, the system will heat up to 1,250 kilograms of steel billets with a 51-millimeter diameter per hour to the required temperature of 1,250 degrees Celsius.

“EloForge™ is part of our ForgeLine™ and has recently been re-engineered completely. It provides a compact design and consists of different modules. These can be combined flexibly to achieve optimal productivity, stable processes and high product quality,” says Elotherm do Brazil General Manager José Machado.

Forjasul Canoas is part of the Tramontina Group and since 1959 has been a pioneer in the field of forged products for high-voltage transmission lines, for the steel industry, the shipyard and oil application as well as hand tools. Their products range from forged hooks, forged electrical hardware to forged vises – an exclusive Forjasul product on the Brazilian market.

The project with Forjasul is one of two current orders for an EloForge™ system from Brazil and further strengthens SMS Elotherm’s position in the Brazilian market for forging equipment. EloForge™ is available for billets up to 100 millimeters, for slabs up to 240 millimeters and also for bar material up to 360 millimeters OD.
High energy efficiency, small space requirement

**SMS Elotherm supplies machines to Ovako**

SMS Elotherm, Germany, has been awarded two orders for induction heating equipment by Ovako Tube and Ring AB in Hofors, Sweden. EloBar™ and EloTube™ machines by SMS Elotherm combine high energy efficiency with a comparatively small space requirement.

EloBar™ will be used at Ovako’s forging operations to heat steel bars at a production rate of up to 8,000 kilograms per hour. With an installed electrical power of 4,000 kW, bars of up to 130 millimeters diameter can be heated up to 1,220 degrees Celsius.

SMS Elotherm supplies the bar handling system, the induction heater with a hot shear and an industrial robot for the transfer between hot shear and press. “EloBar™ belongs to our ForgeLine™ series which can be designed in a very flexible way,” says Torsten Schäfer, Sales Representative at SMS Elotherm. “We have configured this energy-efficient system for Ovako exactly to the customer’s needs.”

**Better tube quality with EloTube™.** The EloTube™ is part of a modernization program of Ovako. The facility will be placed in front of an existing Assel mill in a seamless tube plant. Hollow blooms coming directly from an upstream rolling mill will be reheated and equalized before entering the Assel mill.

Dr. Guido Opezzo, Sales Representative at SMS Elotherm: “The temperature of the shell is increased to 1,100 degrees Celsius and better temperature homogeneity leads to enhanced of Assel mill operation. Also, the sizing forces can be reduced and the lifetime of the sizing rollers is extended due to less wear and tear.”

The induction system consists of six coils powered by state-of-the-art converters with transistor technology (IGBT), totaling a rated power of 6,400 kW. The demand for floor space of this reheating unit is less than seven meters in length and 2.5 meters in width.

Process control is realized by a combination of a tube speed measurement system based on laser-Doppler technology and a bicolor pyrometer for temperature measurement. “The induced power is determined by the speed and the incoming temperature of the shell. Overheating of the material is prevented and the optimum temperature level for the following sizing mill operation is achieved,” says Opezzo. The EloBar™ and EloTube™ facilities will be commissioned in mid-2013.

www.sms-elotherm.com
The complex issue of repair

Pooled repair knowledge at SMS Siemag

No two are ever alike. Repairs are more than the Wikipedia definition: Restoration of the original condition of a defective object. Depending on the state of wear, a component may be nearly intact in the one case, but can no longer be saved in the other. The mandrel body of coiler A may still be in good order whereas that of coiler B must be considered no longer operational.

Repair of core components

The Service Division of SMS Siemag has attended to this complex issue and just recently bundled its activities and provided sufficient space for performing repairs. On a surface of approx. 3,000 square meters, a dedicated repair area was established. The core competence is represented by a team of skilled and experienced staff members from the assembly and the repair departments.

“This new repair center enables us to do repairs in a more customer-oriented and flexible way in a faster time frame,” says Lars Scheuermann, responsible for the new repair team. “On the basis of the customer’s inquiry we analyze as to whether a repair directly at their plant (on-site) or in our workshop (off-site) is the best choice.” In the case of an on-site repair, the technical service experts take care of the entire repair transaction at the customer’s location.

Further tasks of the technical customer support include plant inspections and trouble-shooting. Inspections are a prerequisite for the perfect operation of a facility. In terms of software, the service staff are supported by the Integrated Maintenance Management System (IMMS) and the Genius CM for plant monitoring.

In the case of an off-site repair, the component to be overhauled is transported to the workshop after it has been removed from the plant. Removal and installation is done by the SMS Siemag service specialists.
In the new repair center, a service team will perform the disassembly work in due time. Subsequently, the technicians will determine and document the wear condition of the components to be repaired in a detailed damage analysis.

Various experts in charge of design, quality control, assembly and service are involved in each single repair project. This cross-disciplinary repair team analyzes the wear condition and decides on the repair measures to be initiated. The result thereof will be submitted to the customer in the form of a detailed offer. SMS Siemag furthermore supports plant owners in reducing the components’ wear and thus extended the useful life of the parts.

Reliable repair of Morgoil® bearings

35,000 Morgoil® roll-neck bearings supplied by SMS Siemag speak for themselves in terms of reliability and customer satisfaction. “Apart from spare parts sourcing, we offer the customer further services such as technical assistance and on-site support,” says Konrad Roeingh, General Manager Morgoil® Bearings. “If so desired, we will technically improve the products in the course of repairs which helps keep the customer’s plants competitive.” The services rendered by the Morgoil® Bearing department cover, apart from the supply of complete bearing sets for hot and cold rolling mills in the steel and NF-metal industry, the following activities:

- Off-site repair of bearing bushes, neck bushes and chocks
- Assistance in bearing inspections
- Supervision of modernization measures to adapt existing bearings to the latest state-of-the-art site
- On-site services, including training programs for the operating staff

Hence, SMS Siemag satisfies the technical requirements for offering galvanic NiCo/Ni coating and also ceramic copper-plate coating (UniGuard®) all over the world.

On-site and off-site repairs worldwide

To offer customers the best possible service close to their facilities, 35 global service locations are all set up to provide assistance with either on-site or off-site repairs. New approaches, for example standard repairs or repair framework contracts,

In its service workshops in the U.S.A., China, Brazil, Russia, India and Turkey, SMS is already carrying out repairs with great success.

Copper plate service around the world

Parallel to the incorporation of the former CSP® Copper Plates department, all customer inquiries worldwide concerning copper plates for conventional and CSP® casters are now centrally managed and processed by the Technical Service Division. Jointly with SMS Millcraft, U.S.A., it offers individual solutions to the customers. This is especially true for know-how relevant decisions concerning material and coating.
Fast and safe with ROCS

Reliable rolling oil quality

The outcome of the recent rolling oil measurement is on the desk. How safe are these results? The quality of stainless steel and aluminum strips reflects the purity of the rolling oil. But is the measuring system really reliable?

With the mobile sensor system ROCS (Rolling Oil Contamination Sensor System), SMS Siemag offers an innovative method for long-term measurement of rolling oil contamination that can be used directly at the plant. Rolling oil does not only serve for lubricating the roll gap, but also for transporting the particles incurred in the forming process to the filter system which frees the oil from the dirt. Regular oil checks ensure the quality of the products. And this increases the productivity of the plant. The new ROCS by SMS Siemag provides the plant users with a foundation for assessment of the filter elements. ROCS offers specific measures for improving the oil quality which in turn favors the surface quality of the rolled stock.

And this is how the new ROCS service works: An optical particle counter measures the dirt content of the rolling oil sample. The moisture content and the temperature are also determined by ROCS. The activities in the customer's plant are carried out by a service technician. He will connect the sensors and take care the instrument is operating smoothly. Within 15 minutes, the first result will be available in the internal laboratory.

For a detailed analysis, ROCS records the measured data over a period of up to four weeks. Within a short time, the customer will thus obtain an impression of the current state of the rolling oil and the running process. The data will then be evaluated and prepared by SMS experts and the results communicated to the customer, including corresponding recommendations, in the form of a report. The days are gone when time-consuming and cost-intensive manual measurements had to be made. ROCS provides immediate and reliable information on the condition of the plant and the performance of the filter system.
In brief:
Latest services

- ArcelorMittal Dunkerque, France – TECademy Morgoil® training at the 12-stand hot rolling mill
- ArcelorMittal Poland S.A., Krakow, Poland – Inspection of hydraulic and automation systems of the cold rolling mill, measurement of axial components; damage recording for chocks, oil and sealing systems
- Aleris Aluminium Koblenz, Germany – Emergency service after a gear-unit bearing damage
- Al EZZ Dekheila Steel Company-Alexandria E ZDK, Egypt – Inspection of the roller cooling system at a CSP® plant tunnel furnace
- Cia Siderurgica Nacional, Brazil – Repair of two crane rope drums
- Elval Hellenic Aluminium Industry, Greece – Supply of monitoring software including installation and training at the aluminum hot rolling mill
- Eregli Iron and Steel Works, Turkey – Test conversion of bearing locks at the seven-stand hot rolling mill
- Gallatin Steel Company, U.S.A. – Technical assistance at the CSP® plant
- Hyundai Steel, South Korea – Supply of mill-pinion gear units and descaling system for the heavy-plate mill
- Ilva, Italy – Repair of CVC® blocks in the hot rolling mill
- Minmetals Yinkou Medium Plate, China – Supply of bending and shifting blocks for the heavy-plate mill
- Nucor Corp, U.S.A. – Technical assistance at the CSP® plant
- Saudi Iron & Steel, Saudi Arabia – TECademy training for cold rolling mills, 3D laser measurements, repair of coiler mandrel and gear unit at the hot rolling mill
- Severstal, U.S.A. – Supply of mill pinion sets
- Tata Steel IJmuiden, Netherlands – Inspection of chocks
- Outokumpu VDM Werdohl, Germany – Stand measurement and alignment of deflector rolls
- USIMINAS-Ipatinga/Cubatão, Brazil – UniGuard® coating of copper-plate narrow and wide sides and nickel-plating of copper-plate wide sides at the continuous casting plant / UniGuard® coating of copper-plate narrow and wide sides at the continuous casting plant
- Voestalpine Stahl GmbH, Austria – TECademy Morgoil® training at the seven-stand hot rolling mill
Quality unites – worldwide. This is the maxim of the SMS Siemag Technical Service Division which is continuously extending its presence in important markets such as China and India. The customers benefit, for example, from new manufacturing and service workshops that will ensure the accustomed SMS quality. The high quality level is furthermore reflected by the skilled personnel undergoing regular professional training by SMS Siemag. At the end of 2012, the first international Service Sales Seminar was held in Hilchenbach, Germany.

“Our goal is to familiarize the staff with the products of SMS Siemag, especially in the field of service, and with the Hilchenbach location. Furthermore, we want the colleagues to exchange their ideas and experience across national borders and to enhance their network,” says Pino Tesè, Member of the Management Service.

During the one-week seminar, the participants had enough time and opportunities for sharing their knowledge as the seminar was attended by experts from Italy, India, China, Brazil, Russia, and South Africa, in addition to the Hilchenbach service specialists. “It is a good thing to become acquainted with the colleagues from other SMS locations and to learn about the challenges in their countries,” says Ni Jianren, Department Manager Service Sales, SMS Siemag location Zhangjiagang, China, during the seminar.

In the course of the event, a number of internal and external instructors provided knowledge on such topics as “Coating/Plating” or “Condition Monitoring Systems”. The German colleagues provided information on current service products and new technical developments. “We pass on the knowledge to our employees,” supplements Tesè. “This is the only way to gain the customers’ trust in reliability and quality worldwide.”
Good cooperation: Thanks to the close cooperation between the maintenance staff of PetroSA, South Africa, and a service team of SMS Siemag South Africa, the clamping devices of the arc furnace at Unit 10 Catalyst Plant were refurbished within just two weeks instead of four.

The arc furnace in the Mossel Bay works serves to fuse the materials haematite, mill scale, and promoters to produce the catalyst used in the synthol reactors. This work included the movement of huge pieces of equipment to replace seals, valves and pipes.

On this occasion, the entire grease system of the arc furnace was renewed and the existing grease system completely removed. The lube points of the new system were arranged at ground level by the service experts of SMS Siemag, which made them easier to reach.

Jean van Staden, Reliability Manager at PetroSA, congratulated both teams for getting this job done within record time. “The teams have done a great job,” appreciated van Staden.

that reason, advanced seminars will be held at regular intervals in the future to strengthen the connection between the German and the international service locations. “This will be to the benefit of our customers who will not only be supplied with high-tech products, but get competent advice at their location, as to how they can make their plants more efficient,” says Tesè. Ganesh Bayari, Deputy General Manager Technical Service in India, underlines this statement: “I will communicate this quality-oriented awareness experienced during the seminar to our Indian customers.”

The mission statement of the service experts is: “We are X-Cellize – the original service by SMS Siemag.” The SMS Siemag Service is the competent partner to meet all challenges involved in the operation of a plant. The company offers a comprehensive product portfolio and a vast process know-how ensuring the customers’ long-term success. In addition, a worldwide service network convinces with local experts and a high quality level thanks to more than 100 years of experience.

The range of services includes the supply of spare parts, maintenance services, on-site erection, training courses, and modernizations, in addition to the Genius CM (Condition Monitoring) and IMMS (Integrated Maintenance Management System).
Service for continuous production

**SMS Meer improves availability of extrusion presses at HMT**

During the alignment check with plant inspection technical measurements are performed on the presses to evaluate the machine condition. “On the basis of the service report from SMS Meer we can take decisions for investments in replacements and expansions more easily and plan our maintenance measures more specifically. This saves time and unnecessary costs and contributes considerably to an increase in our machine availability and to preventive maintenance,” said Christian Schwarz, Head of Production at HMT. “Although SMS Meer is not the supplier of our extrusion presses, we have opted for the service team from SMS Meer. Their many years of experience and an their excellent service quality convinced us," Schwarz added.

HMT is among the most successful extrusion companies in Germany and operates an advanced extrusion plant for quality profiles.

New subsidiary in Bahrain

**SMS Meer Middle East established**

With immediate effect, SMS Meer is represented in Bahrain with its own subsidiary.

Siegfried Gruber has assumed responsibility and the company has nine more staff members at the outset. Customers from the Gulf Region can be easily supplied from Dubai and Bahrain with products and services from SMS Meer. Gruber and his team are already working on their first major project: supplying the customer SULB (who has purchased a heavy beam mill in Bahrain) with spare parts.
It took SMS Meer merely seven months to upgrade a screw press SPKA 11200 for Wuxi Turbine Blade (WTB) in Wuxi, Jiangsu Province, China. After assembly at the new location SMS Meer replaced the screw and the tierods to make sure that the press can now resume production reliably and safely.

"After the modernization the press is now again state of the art," says MoJianqiang, Deputy Director and Chief Engineer Forging Equipment at WTB. "Whenever we order something from SMS we can be sure to receive the required quality on the agreed date."

In 1994, Wuxi put the clutch-operated forging press with a hard-on-hard blow force into operation. Production has had to be relocated since a new residential area is being established at the company’s location. Together with the SPKA 11200 SMS Meer has also relocated WTB Wuxi, China

Screw press modernized in only seven months

The screw press SPKA 11200 was modernized at WTB by SMS Meer.

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Increase productivity, avoid downtimes

F.W. Brökelmann Aluminium signs maintenance contract with SMS Meer

F.W. Brökelmann Aluminium from Ense-Höingen, Germany, has concluded a maintenance agreement with SMS Meer for three extrusion presses with pressing forces of 20 MN, 23 MN and 25/27 MN. Brökelmann produces high-precision aluminum profiles on the plants. With the maintenance contract, the company intends to avoid unscheduled plant downtimes and increase productivity.

To do this, SMS Meer has developed an individual maintenance service program together with the customer. Every month, the condition of the press is assessed. Based on this assessment, recommendations for the servicing measures are made.

At annual intervals, the optimization potential will be reconsidered – particularly that of hydraulic and electrical processes – and documented.

The yearly scheduled plant downtime of the company is accompanied by the service experts from SMS Meer and used for the implementation of the measures specified.

Wolf-Peter Burock, Head of Maintenance at Brökelmann: “SMS Meer Service applies the latest technical and constructive developments from the new plant business. In this way, our modern machinery remains up to date and our efficiency is increased.”

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For aluminum recovery from recycled material a special melting technology is required which needs to fulfill high ecological and economical demands. Hertwich Engineering, a subsidiary company of the SMS group, has therefore developed the Ecomelt furnace series that fulfills these requirements.

In Germany, recycling is nowadays the most important raw material source of the aluminum industry. At the end of 2011, approx. two thirds of the metal produced have been recovered by recycling. Worldwide, the recycling industry already covers almost one third of the aluminum demand. In line with this development, the technology of melting aluminum scrap has gained in importance.
Aluminum recycling with integrated growth motor

The material value of aluminum makes it economically beneficial in the long term to recycle all reusable aluminum at the end of its service life. In Europe, which is short of raw material resources, much progress has been made in this direction. An advantage of recycling: with roughly five percent of the original energy input it can be processed to metal of high value. The demand for aluminum is growing constantly and about 35 percent of it is covered by recycling.

A steady increase of the amount of scrap can be expected. In Germany, the production of aluminum casting alloys has more than doubled since 1995. In 2020, the German production volume is expected to reach already more than 1.5 million tons. Worldwide it is estimated that annual production during this period will be rising to approx. 30 million tons of recycled material.

An intelligent technology

The rapid growth in volume turns scrap processing into a key technology of aluminum processing. In fact, the remelt plants have gone a very long way in a relatively short period of time. This route has led from melting of small volumes used for rather subordinate purposes towards an exceptionally complex system of recovery.

Cont’d on next page
However, the remelt plants are facing a number of problems when scrap is processed:

- First of all, scrap with a composition not precisely defined has to be converted into metals with the highest demands in terms of alloy and quality. The remelt plant is expected to provide a careful matching of alloying constituents involved in the whole process. This is made more difficult by the contamination of the scrap. Adhering materials, chemical overlays, admixtures of steel parts or others, pollution – all this has to be mastered by the melting process.

- The process has to be designed in an environmentally compatible way; harmful emissions (NOx, dioxins and others) must be avoided and energy input in the most economical way is desirable. In Central Europe, environmental requirements concerning the melting process are strictly regulated.

- Finally, the process of scrap processing is also subject to strict economical criteria.

Since the 1990s, the growth in volume and particular requirements in terms of melting resulted in the development of special recycling furnace plants. Hertwich, with meanwhile more than three decades of experience in the aluminum melting furnace sector, was one of the first to deal with this technology. Nowadays, the company is able to provide an optimal melting unit for all these tasks.

Hertwich has introduced the term “Ecomelt” for economical and environmentally-friendly processing of aluminum scrap. Starting from a basic idea, Ecomelt describes a successful furnace series which has been constantly adapted to the increasing requirements of the recycling industry and the environment.

Ecomelt – a trendsetting recycling technology

The term Ecomelt chosen by Hertwich draws attention to two outstanding furnace characteristics: economy and ecology. How successful this combination is can be derived from the distinguishing features of this furnace series:

- Integrated scrap preheating
- Gasification of organic constituents
- Combustion of resulting gases
- Melting of scrap

Economic benefits also present themselves, among other things from low energy demand due to utilizing the energy content of organic contaminations. This results in a significant reduction of the operating costs and at the same time has also a favorable ecological effect through low emissions of CO2. Other minimal emissions (NOx, dioxin, VOC, no salt) also contribute to eco-friendly furnace operation.

The realization is based on the idea of a multi-chamber furnace combining the processes of preheating and gasification and of melting and casting in one unit.
Copper wire rod production with Contirod®

Top quality most efficient

The Contirod® process for continuous casting and rolling of copper wire rod proven for 40 years could now be made considerably more energy efficient. A newly designed melting furnace ensures that heat is more efficiently transferred from combustion gas to raw material – add to this an automatic combustion control system. The result is a minimization of oxidation of liquid copper as well as the reduction of gas consumption due to optimized combustion conditions.

By using variable-frequency three-phase drives for both the blowers of the melting furnace and the individually-driven stands of the mill train, power consumption could also be drastically reduced. At the Chinese copper wire rod manufacturer Eastern Copper the fully optimized Contirod® process is already in use. The new plant consists of a shaft melting furnace from SMS Meer and a 20-ton holding furnace, a Hazelett twin-belt caster and a continuous SMS Meer rolling mill, the 14 mill stands of which are equipped with single drives and latest electrics for optimal process control.

During the melting process, a quantity of 10 to 20 kilograms of dust per ton of steel is generated, which is removed via the exhaust air. Exhaust air cleaning is necessary to ensure sustainable steel production and is governed by numerous regulations. Hydro-hybrid filter systems made by SMS Siemag make sure that these regulations are met and offer considerable economic advantages.

SMS Siemag is retrofitting six existing converters with hydro-hybrid filter systems in the works of ArcelorMittal Kryvyi Rih in Ukraine. For this purpose, the existing BOF wet dedusting systems are supplemented by with wet electrostatic precipitators. This procedure considerably minimizes the investment costs and the expenses for production downtimes as compared with the installation of a new conventional dry dedusting system. Moreover, the hydro-hybrid filter system operates efficiently: the electricity costs saved by our customer amount to approx. one million euros per year. This innovative process also satisfies from an ecological point of view: SMS Siemag guarantees clean-gas dust contents to be less than 10 milligrams per standard cubic meter of converter gas. Thus, the retrofitted plant even meets the most stringent restrictions placed on exhaust air cleaning.

Hydro-hybrid filter systems

Revamp for high purity of the air

Economic and ecological benefits

<table>
<thead>
<tr>
<th>Ecological benefits</th>
<th>Economic benefit</th>
</tr>
</thead>
</table>
| Saving potential:   | Saving potential*:
| Approx. 27 % as regards fuel consumption | approx. 4 euros/ton |
| Approx. 67 % as regards power consumption | |

* compared with predecessor technology

<table>
<thead>
<tr>
<th>Ecological benefits</th>
<th>Economic benefit</th>
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<tbody>
<tr>
<td>Reduced emissions:</td>
<td>Electricity cost savings:</td>
</tr>
<tr>
<td>Dust: &lt; 10 mg/Nm³</td>
<td>Up to 1 million euros/year</td>
</tr>
<tr>
<td>CO₂: approx. 6,500 tpy*</td>
<td></td>
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</tbody>
</table>

* Potential for reduction of CO₂ emissions, calculated with grid factor Germany
Continuous casting has undergone major technological improvement during the last few decades. Actually, adjusting screws that can be simply turned to increase plant availability and improve the product quality are hard to find. However, SMS Siemag has discovered potential for improvement in the mold and has introduced an entirely new measuring technology for the copper plate.

Never before has a reliable production process for quality steel been more important than today. The constantly growing spectrum of steel grades to be produced under extremely different process control conditions calls for exact knowledge of the casting process and requires appropriate technologies for an objective intervention in the production process.

SMS Siemag supplies the “intelligent” copper plate with an integrated fiber-optic-based temperature gage. The HD mold provides measured data of high quality and reliability. Temperature measurement is up to three times faster than before, taking place without any interferences within electromagnetic fields. With the same wiring effort, a ten times higher density of measuring points is achieved compared to solutions with conventional thermocouples. Thus the measurement can cover a wide area over the complete mold height. The “intelligent” mold, developed by SMS Siemag, does not require any maintenance effort by the plant operator. Time-consuming wiring is a thing of the past.

The measuring points can be freely selected and placed at any position of the mold surface. This flexibility makes it possible, for example, to monitor the mold level more thoroughly than ever before. The new HS Mold provides additional details about the casting process which were impossible to measure in the past.

Copper plate of a CSP® mold with integrated, maintenance-free sensing equipment.
Specially developed measuring points and software

Today, modern temperature monitoring technology is based on fiber optics. Compared to conventional solutions based on thermocouples, an up to ten times greater density of measuring points with improved and increased measuring dynamics provides substantially more and better process information. A new software architecture was developed for the simultaneous processing and online visualization of this information (up to 10,000 process variables at a high sensing rate of 50 milliseconds). The software architecture has the capacity of running and monitoring up to twelve process models. The visualization system and the calculation tool are compatible with the various continuous caster types.

For the immediate detection of casting defects, a special algorithm was developed and integrated into an online calculation model which forms part of the modular HD mold software architecture.

Seeing – understanding – intervening

This opens up new possibilities. For example, it is possible to make online calculations of the local strand-shell growth based on data from the high-resolution measurements taken in the casting direction. This provides useful information on the strand behavior in the corners of the mold. In the case of poor contact performance, remedial action can be immediately taken by adjusting the mold taper.

Dr. Dirk Lieftucht, development engineer at SMS Siemag, explains: “For many years, I have been active in the field of process control in the mold. We have now reached our goals of sticker detection and detailed strand-shell calculation, thanks to precise, spatially resolved heat balances.”

The advantages of the HD mold at a glance

- Provides an extensive and detailed picture of the solidification process
- Best dynamics and quality of the signals within electromagnetic fields
- Maintenance-free sensors requiring dramatically reduced wiring
- Online computation of the local strand and shell growth
- Monitoring of contact behavior of the strand
- Unambiguous detection of stickers and longitudinal cracking to reduce breakout rate
- Significant reduction of operating costs

“Migrating to the HD mold system will provide our customers with process- and product-related benefits. They will receive a system that improves the quality of their products and raises the availability of their plants. Both effects will lead to lower operating costs.”

Dr.-Ing. Jochen Wans, SMS Siemag, responsible for the marketing of the HD mold
Together with the company Lechler, SMS Siemag has developed a new spray nozzle technology: the X-Cast® EcoCooler. This nozzle covers an extended control range and consumes less media.

To be able to cast the wide range of different steel grades and control the respective processes, infinitely adjustable casting widths, variable casting speeds and quality-specific cooling strategies are required. The objective setting of temperature profiles during solidification, a rise in production and through-put without compromising on quality, objective compound casting and defined conditions for the soft reduction process in the containment section are only possible with a comprehensive secondary-cooling concept. To achieve optimal solidification of the hot strand in the containment zone, the process automation system uses cooling models which calculate the required quantities of cooling water for the individual cooling water zones and issue, in a differentiated way, the nominal water values needed to achieve the required spray water volume.

Air-mist nozzles have become indispensable in secondary cooling, because only with a second compressible atomizing medium – the compressed air – can the nozzle cover the required wide control ranges. The mixing of the two media takes place inside the nozzles. The connecting block of the nozzles also contains a chamber in which the secondary cooling water and the atomizing air are mixed. In the mixing chamber, pre-atomizing of the media takes place. From there, the mixture of media is conveyed to the mouth piece via an extension tube. The mouth piece forms the actual spray jet and produces the final atomizing effect. At all times throughout the complete control range, a sufficiently high counter-pressure is generated inside the nozzle. This counter-pressure acting on the mouth piece provides the water drops with the kinetic energy needed for the final atomization and ensures proper forming of the spray jet at variable water pressures. On this basis, SMS Siemag and Lechler developed a spray nozzle technology with the objectives of increasing the efficiency of media use and extending the achievable control range over that achievable with conventional air-mist nozzles. The current result is the optimized air-mist nozzle X-Cast® EcoCooler.

By optimizing the flow conditions inside the nozzle, air consumption could be reduced by one fifth. The optimized nozzle achieves an approx. 15 percent higher cooling intensity (heat transfer coefficient) at maximum water pressure, without consuming any more water. At the same time, the nozzle can cover a wider control range. The nozzle has undergone comprehensive testing and has proven successful under all operating conditions occurring in continuous casting plants.

Proven X-Cast® EcoCooler

Fazit: About five million Nm³ of compressed air can be saved in a two-strand slab caster fitted with approx. 1,000 air-mist nozzles. Accordingly, some 100,000 euros can be saved on operating costs (basis: 0.02 euros per Nm³).

Contact: axel.weyer@sms-siemag.com
Together with the company Georg Springmann, SMS Siemag developed a cost-efficient and effective solution that reduces the time needed for changing media connections of any kind. As a result, plant availability is markedly increased.

The new quick-change coupling uses a special flange to connect the ends of two media-carrying hoses or pipes. It consists of two interconnected coupling segments, which join and hold the flanges tight, sealing them in the process. The advantage of this solution over the previous technique is that only one locking system needs to be opened and closed. The coupling is secured threefold. As the coupling is flexibly positioned, connections that are not perfectly aligned can be easily centered during closing of the coupling.

For new installations and modernization projects. The convenient mounting method and easy handling of the new coupling minimize the risk of injury and increase plant safety. This makes this practical solution a rewarding investment with a very good cost-benefit ratio.

www.sms-siemag.com/qr/swk
In three events the SMS Meer Business Area presented itself on topics of tube technology in Dubai: At the “Tekno Tube Arabia”, the “DVS Congress” and the “Middle East Steel Tube & Pipe Conference” staff members of the company presented its range of products and services as well as new innovative solutions.

Tekno Tube Arabia. The international trade fair for industrial machinery, metal treatment, tools for machines and the tube industry took place in Dubai already for the fifth time. The only event of this kind in the Middle East received a high-ranking visit this year: Dirk Elbers, Düsseldorf’s Lord Mayor visited the exhibition stand of SMS Meer in Dubai. He was accompanied by Christoph Blume, Managing Director of Düsseldorf Airport, and Werner Dornscheidt, President & CEO of Messe Düsseldorf. The visitors discussed topics relevant to the Arab region with Dietger Schroers of SMS Meer and the guests were also highly interested in the “ecoplants” issue.

DVS Congress. In connection with the Tekno Tube Arabia the “German Association for Welding and Associated Processes (DVS)” organized a DVS Congress for the first time. Frank Alte, Sales Representative at SMS Elotherm, presented innovative solutions under the title “Precise, energy-efficient induction systems for the tube and pipe industry”.

Middle East Steel Tube & Pipe Conference. Around 80 participants attended the Middle East Steel Tube & Pipe Conference in Dubai this year. As main sponsor of the two-day event SMS Meer took part in the event with two lectures. Dr. Hans Pelster from the Forging Technology Division reported on the differences of extruded and radially forged tubes and Manfred Topüth from the Service Division explained the new services rendered for the local tube market.

The visitors showed great interest in the presentation “Middle East OCTG and Line Pipe Market – what does the future hold?” of the British management consultancy Hatch.

Preview: Beijing, May 29 to 31, 2013

Symposium on Thermal Process Technology

From May 29 to 31, 2013, SMS Siemag together with Drever will hold a symposium themed “Heat/Treat Your Business” in Beijing, China. The focus will be on topics relating to thermal process technology.

Experts will explain new developments in the fields of furnace and cooling technology for steel and aluminum. On May 31, the participants will have the opportunity to pay a visit to the company Shougang Shunyi.
More than one hundred guests took up the invitation by SMS Siemag to participate in a symposium on current continuous casting technology held in Zhangjiagang near Shanghai.

Key topics of the event included solutions for the production of high-quality slabs and technical innovations. SMS Siemag experts presented, among other things, new developments in the field of E&A, innovative reconditioning methods for copper mold plates and the new STEC-Roll® strand guide rollers. In the Zhangjiagang workshop, the participants in the symposium had the opportunity to take a look at the STEC-Roll® strand guide rollers developed by SMS Siemag.

The STEC-Roll® is a reliable and economic alternative to pinch rolls with split center bearings. Unsplit bearing housings prevent water from entering and substantially prolong the service life while providing comparable bearing strength. The STEC-Roll® is maintenance-friendly, enabling a roller line to be disassembled in one hour and reassembled in two hours without needing any specialist tools.

Trade fairs 2013

<table>
<thead>
<tr>
<th>Event</th>
<th>Dates</th>
<th>Location</th>
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<tbody>
<tr>
<td>Aluminium Middle East</td>
<td>April 23 to 25</td>
<td>Dubai, United Arab Emirates</td>
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<tr>
<td>AISTech 2013</td>
<td>May 6 to 9</td>
<td>Pittsburgh, Pennsylvania, U.S.A.</td>
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<tr>
<td>44th Steelmaking Seminar – International – ABM</td>
<td>May 19 to 22</td>
<td>Araxá/Minas Gerais, Brazil</td>
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<tr>
<td>2nd Aliaga Steel Summit</td>
<td>May 28</td>
<td>Izmir, Turkey</td>
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<tr>
<td>2013 SEAISI Conference and Exhibition</td>
<td>June 3 to 5</td>
<td>Pattaya, Thailand</td>
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<tr>
<td>17th Shanghai Metallurgy Expo, Tube Expo, Metal Expo &amp; Baosteel Academic Conference</td>
<td>June 4 to 6</td>
<td>Shanghai, China</td>
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<tr>
<td>INFACON XIII</td>
<td>June 9 to 12</td>
<td>Almaty, Kazakhstan</td>
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<tr>
<td>Rolling 2013</td>
<td>June 10 to 12</td>
<td>Venice, Italy</td>
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<tr>
<td>PowderMet 2013</td>
<td>June 24 to 26</td>
<td>Chicago, Illinois, U.S.A.</td>
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<tr>
<td>Metallurgy-Litmash Tube Russia Aluminium/Non-Ferrous 2013</td>
<td>June 25 to 28</td>
<td>Moscow, Russia</td>
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<tr>
<td>Aluminium China 2013</td>
<td>July 2 to 4</td>
<td>Shanghai, China</td>
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<tr>
<td>68th Annual Congress, ABM</td>
<td>July 30 to August 2</td>
<td>Belo Horizonte, Brazil</td>
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“The information provided in this brochure contains a general description of the performance characteristics of the products concerned. The actual products may not always have these characteristics as described and, in particular, these may change as a result of further developments of the products. The provision of this information is not intended to have and will not have legal effect. An obligation to deliver products having particular characteristics shall only exist if expressly agreed in the terms of the contract.”