SMS MEVAC

ADDING VALUE TO YOUR STEEL

Pretreatment of hot metal, secondary metallurgy and tertiary metallurgy
An impressive RH plant at CSC in Taiwan.

SMS Mevac wins people over with its plants and know-how when it comes to the production of high-quality steel grades. This is illustrated by numerous references in recent years.

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SMS Mevac

New management

The Management of SMS Mevac GmbH in Essen underwent a reorganization as of April 1st, 2014. Markus Hüllen, previously Head of Technical Department, has assumed the position of CEO. He is assisted by the authorized representatives of the Managing Board, Markus Dietrich, also newly appointed as CFO, and Michael Neumann, COO. With about 100 employees worldwide, SMS Mevac boasts an efficient team offering high flexibility and especially strong competence in metallurgy and project management.

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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.”

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IN BRIEF

Order for SMS Mevac UK

Modernized degassing plant

SMS Mevac UK and SMS India received the order to modernize the RH degassing plants in steelworks 1 and 2 of JSW Steel in Toranagallu, India. The plants had originally been built by SMS Mevac UK in cooperation with SMS India. The degassing plant in steelworks 1 operates with a rocker-type lifting system. The revamp will include upgrades to the alloy feeding system. The vacuum pump will be equipped with a vacuum pressure control system to enhance the flexibility of operation. The amount of material caking in the vacuum vessel during carbon removal will be reduced. The plant in steelworks 2 will receive a ladle car with two rests, significantly cutting the cycle time. SMS Mevac will also install an automatic temperature measuring and sampling system with slag breaker.

SMS Mevac participates in research project

Raising energy efficiency in metal bath treatments

Up to 130,000 megawatts per hour of electricity can be saved on vacuum treatment operations in German steelworks. SMS Mevac pursues this ambitious target together with Lech-Stahlwerke GmbH, AG der Dillinger Hüttenwerke, VDEh-Betriebsforschungsinstitut GmbH and the Institute for Ferrous Metallurgy of the Technical University of Aachen. This project is funded as part of the 6th Energy Research Program launched by the German Federal Ministry of Economics and Technology.

The thermal losses arising during the vacuum treatment of liquid steel can still not be predicted with sufficient accuracy and reliability. Depending on the type of ladle furnace, lengthy “cold purging” or reheating may become necessary. This costs energy and money. Through the joint research project, the participating companies and institutes want to identify significant potentials for energy saving. The activities will focus on three main aspects: temperature control during the vacuum treatment, dynamic adjustment of the vacuum treatment time and optimization of the required vacuum pressure.

SMS Mevac supports the project through efficiency calculations for the design and operation of vacuum pumps. Through this, steelworks operators will be able to receive optimized pump systems with minimum energy requirements both for the operation of existing and the construction of new vacuum degassing facilities. First preliminary studies have shown that more efficient bath temperature control during the secondary metallurgy treatment may reduce electricity consumption by ten percent. The results provided by the project will help metal-producing companies to further improve their competitive edge. The research project will run for a period of three years.

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Secondary-metallurgy plants for different applications serve as a link between primary steelmaking in the melting unit and continuous or ingot casting processes. Secondary-metallurgy processes take place exclusively in the ladle. They comprise all secondary treatments required for the production of stainless steels.

Liquid hot metal must be pre-treated to reduce the contents of silicon, phosphorus and sulfur. Only this makes it possible to fulfill the preconditions for the further treatment of the liquid steel.

The objective of tertiary-metallurgy treatments is the production of isotropic materials for highly challenging applications. These materials are mainly used in sectors such as the aerospace, energy, automotive as well as oil and gas industries.
PST – ACROSS-THE-BOARD SUCCESS

SMS Mevac wins people over with its facilities and know-how when it comes to the production of high-quality steel grades.

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 Koltipno, 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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In operation since 2012: The hot-metal desulfurization plant at Tata Steel, which was supplied by SMS Mevac.
A STRONG PARTNER WITH PLANT EXPERTISE

For the production of high-quality steel products, Tata Steel operates an integrated steel plant for flat and long products in the Indian city of Jamshedpur. The plant has an overall capacity of more than ten million tons per year. For the installation and commissioning of its newest production line, Tata Steel relied on strong partners in SMS Siemag, Paul Wurth and SMS Mevac.

**Blast furnace „I“**

<table>
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<tr>
<th>Effective volume</th>
<th>3,814 cubic meters</th>
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<tr>
<td>Annual production</td>
<td>3 million tons</td>
</tr>
<tr>
<td>Model of identical design</td>
<td>Blast furnace H</td>
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It is basically identical in design to blast furnace „H“, which was commissioned just before it (in 2008) and, taking into account blast furnaces „F“ and „G“, is already the fourth Paul Wurth plant in Jamshedpur. Blast furnaces „H“ and „I“ are among India’s largest furnaces, and both comprise state-of-the-art technology.

SMS group companies supplied equipment including several blast furnaces, two BOF converters, a twin hot-metal desulfurization plant and a two-strand CSP® facility. SMS also fitted the equipment with the X-Pact® electrical and automation package. Using the equipment, Tata Steel produces more than 2.4 million tons of hot strip annually. „The new plants will enable us to further enhance our competitiveness. SMS Siemag is a reliable partner for us, and we greatly appreciate the high quality of its plants“, says Ratan Tata, CEO of Tata Sons.

In LD Steelworks 3 the hot-metal desulfurization plant, which was supplied by SMS Mevac, is of dual-plant design. It has a treatment capacity of around three millions tons of hot metal per year, which corresponds to an average of 55 melts per day.
Top: The twin hot-metal desulfurization plant has a capacity of 170 tons. The desulfurization is performed by deep injection of calcium carbide and magnesium powders.

Bottom: By using the remote-controlled deslagging machine, the operating personnel are able to remove the highly sulfurous slag in a safe and effective manner without having to leave the control room.

KEY DATA

X-Melt® steel plant

- Two converters, each with a tapping volume of 170 t of steel
- Annual production: 2.8 million tons
- Gear unit with pneumatic emergency drive, lance systems and converter relining devices, maintenance-free lamella technology
- Primary offgas system for both converters: „Demag Baumco“ system
- Extraction capacity 270,000 m³/h
- Secondary dust collection with two electrostatic precipitator units
- Twin ladle furnaces, each 170 t
- Hot-metal desulfurization unit with three million tons capacity per year
Jindal Steel and Power Ltd. (JSPL), India, placed an order with SMS Siemag for the supply of an X-Melt® converter shop including a secondary-metallurgy center and comprehensive environmental technology. The plants will be installed at the Angul site in the district of Odisha. Annual production in phase I, which will be based on operation with two basic oxygen furnaces (BOF), is to amount to 3.8 million tons of high-quality steel. The scope of supply will include two 250-ton BOF – each one complete with a gas cleaning and recovery plant – and three ladle furnaces. SMS Siemag provides the system for primary gas cleaning, which SMS ELEX will equip with a gas conditioning tower and a dry-type electrostatic precipitator. SMS Mevac UK Ltd. will deliver a twin-tank hot-metal desulfurization plant and a vacuum degassing plant.

On August 30, 2013, Bhushan Steel commissioned the western treatment station of the new 180-ton hot-metal desulfurization plant in Meramandali, Odisha, India. The eastern treatment station is to follow shortly. The cold commissioning activities are about to be completed soon. The plant was designed and supplied by SMS Mevac UK in cooperation with SMS India Pvt. To optimize the treatment times, it can be operated in the mono-, co- or eco-injection mode.
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.
Maanshan Iron & Steel

Duplex RH plant for electric steelworks.

Maanshan Iron & Steel (Group) Co. Ltd., located in Maanshan, China, has successfully commissioned the duplex RH plant supplied by SMS Mevac.

The plant is designed to treat heats with a nominal weight of 120 t and features two treatment positions. Each treatment position is equipped with a hydraulic ladle lifting system, a burner lance and a vacuum lock for the addition of ferroalloys. The vacuum is generated by a four-stage steam-ejector vacuum pump with variable pressure reduction for optimized process control.

The duplex RH plant is part of a new electric steelmaking shop which will produce, amongst others, semi-finished products for high-speed train wheels.

Powerful components

Modernization after 45 years.

ArcelorMittal Ruhrort, Duisburg, has contracted SMS Mevac to modernize the steam ejector pump system for the existing RH facility (Ruhrstahl-Heraeus process). Now that the facility has been in operation for 45 years, the wall thicknesses of the ejector system have diminished to critical values. SMS Mevac will be replacing the existing steam ejectors and condensers by new, more powerful components. With the new control system for the pump system, it will be possible to reduce steam requirements and thus energy consumption, control steel splashes and increase the pump-down speed. SMS Mevac’s supply scope comprises the mechanical components of the pump system (including engineering and control system) and supervision services during installation and commissioning. Commissioning is scheduled for the 4th quarter of 2013.

Tubos Reunidos

RH plant with convincing cycle time.

Tubos Reunidos S.L.U., Spain, awarded SMS Mevac the order to supply an RH plant. The plant will be designed to process more than 400,000 tons of vacuum steel per year for the production of seamless steel tubes of high cleanliness in terms of inclusions and very low gas content.

A convincing feature is the cycle time of less than 60 minutes for the metallurgical treatments in the ladle furnace and in the RH plant including subsequent cleanliness treatment in a separate ladle treatment station. This will be enabled by the special arrangement of the individual plants, which has been developed specifically for Tubos Reunidos. The stationary RH vessel will allow the installation of a short vacuum line. To achieve the required sequence rate of the plant, two ladle transfer cars will be employed.
Taigang Group enhances its competitiveness
New duplex RH facilities ordered

Taigang Group International Trade Co. Ltd. has ordered two 80-t duplex RH plants from SMS Mevac. At the end of November 2011, both companies signed the contract together with the consortium partner SMS Siemag Technology (Beijing) Co. Ltd. With the new plants, Taigang intends to further improve its competitive strength in the field of silicon steels.

The first RH plant will be newly erected next to the RH plant supplied by SMS Mevac as early as in 1996. Then the existing fast-vessel-exchange unit will be converted to a duplex plant. This modification will basically comprise the addition of a second treatment station, two new TOP-lance systems and the replacement of the vacuum alloying system. Each of the two plants will be equipped with a four-stage steam-ejector vacuum pump featuring variable pressure reduction (RH-SC) for optimized process control.
With a production volume of almost 10 million t of steel, Taigang is one of China’s major steel producers. In an environment of ever fiercer predatory competition, a growing number of steelmakers are seeking their salvation in higher-grade production. For example, the annual production of non-grain-oriented silicon steels rose from 500,000 t in 2000 to 4.75 million t in 2008. Whereas in the field of grain-oriented silicon steels overcapacities are already triggering a slump in prices, the market for the more sophisticated, non-grain-oriented silicon steels is currently offering promising prospects.

Already before the Cultural Revolution, Taigang had started to produce silicon steels. The company now intends to use the two RH plants for the treatment of silicon steels in order to keep up with the top league.

SMS Mevac’s scope of supply comprises almost the complete basic engineering, key elements of the detail engineering, delivery of core components of the mechanical equipment, the electrical system and the instrumentation, complete level-1 and level-2 automation as well as supervision of erection and commissioning. Commissioning of the first RH-TOP plant is scheduled to take place in the first half of 2013.

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Above: 3D model showing the ladle furnace with the alloy feeding system.

Below: The VOD treatment stand with the vacuum tank car.

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Tons is the maximum nominal weight of the heats which the new treatment plants at Metal Ravne will be designed for.
More capacities for secondary metallurgical treatment

Metal Ravne, part of the Slovenian Steel Group (SIJ), has placed an order with SMS Innse S.p.A. and SMS Mevac GmbH for the planning, delivery and installation of a secondary-metallurgy center.

The center is to be integrated into the existing plants of the Metal Ravne works in Ravne na Koroškem in Slovenia. The new facilities will comprise a ladle furnace and an X-eed® 45-ton/60-ton (VOD/VD) tank degassing unit. "We decided to choose as suppliers a group of the best global producers of metallurgical equipment - the German SMS group and its subsidiaries SMS Innse and SMS Mevac," says Tibor Šimonka, President of the Board of Directors of the SIJ Group.

With this new metallurgical center, Metal Ravne will not only increase its steel production but also create additional capacities for secondary metallurgical treatment. This investment will allow Metal Ravne to add stainless steels to its product range and open up new markets for a variety of additional steel grades. It will significantly increase the company’s market share in the field of remelted steels.

SMS will supply a ladle furnace to be installed in line with the VD/VOD plant and a separate deslagging stand. The plant will comprise a movable tank car and two stationary covers, one for the VOD plant and one for the ladle furnace. The equipment will be designed to treat heats with nominal weights from 45 to 60 tons. Also included in the scope of supply are the vacuum system, a temperature measuring and sampling device, the electrical lifting system and the slewing gantry, a wire feeding machine, the electrical, instrumentation and process automation systems as well as installation and cold and hot commissioning of the equipment. Start-up of the secondary-metallurgy center is slated to take place in the first quarter of 2015. "I am convinced that mutual trust between SMS and SIJ and the outstanding technological competence will result in a further successful project from which all partners will benefit," says Alberto Bregante, Chief Executive Officer, SMS Innse. Michael Thiehofe, Managing Director of SMS Mevac: “For us, this project is the continuation of a long-term cooperation with the SIJ Group and its other steel mill Acroni.” Both SMS companies will handle the Metal Ravne order as consortium partners.

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www.sms-innse.com
Russian steel producer Forpost Management recently successfully commissioned a ladle metallurgical center integrated into the OMZ works in Kolpino. The equipment was planned and supplied by SMS Mevac.

A ladle transfer car takes the heats first to a 120-t ladle furnace and then to a VD tank degasser. On a second track, a tank car takes the ladle holding the liquid steel to a VOD station for the production of high-grade stainless steel. Future plans provide for a ladle furnace position to be added to the VOD line by commissioning the slewing mechanism already in place on the new ladle furnace.

In addition to an increase in steel production to 600,000 tpy, the compact ladle metallurgical center offers a maximum of flexibility for an extremely wide array of metallurgical applications. Ingots of up to 500 t weight can be cast. In addition to the planning, SMS Mevac supplied numerous core components for the ladle furnace and the vacuum plants, supervised the installation and commissioning and provided metallurgical training.
Hyundai Steel orders RH plant.

Hyundai Steel Co., Seoul, South Korea, has awarded SMS Mevac a contract for the supply of a fast vessel exchange RH unit for its secondary-metallurgy facilities in Dangjin. Commissioning of the RH plant is scheduled for 2015. The RH plant will be designed to treat liquid steel in nominal heat sizes of 155 tons and will include a hydraulically actuated ladle lifting system, a burner lance and a vacuum alloying system for the addition of ferroalloys under low pressure conditions.

The vacuum will be generated by a four-stage steam-ejector vacuum pump system with advanced pressure regulation for optimized process control. The fast vessel exchange RH plant will be part of the existing electric steelmaking shop. After treatment, the liquid steel will be cast into blooms on a continuous casting machine. The blooms will be used mainly for the production of automotive parts.

Ellwood Group, USA.

Ellwood National Steel (ENS), Pennsylvania, U.S.A., successfully commissioned its VOD unit for the production of stainless steel ingots. The VOD is an addition to ENS’s existing ladle furnace melt-shop which has been producing carbon and alloy steel ingots since 2005. It is the first VOD facility in the U.S.A. operating with mechanical vacuum pumps, including gas cooling equipment and a bag filter plant for reducing the environmental impact. ENS will also expand its ingot teeming capability to melt ingots up to 45 tons in individual weight. The VOD unit was designed, manufactured and commissioned by SMS Siemag Pittsburgh, U.S.A., and SMS Mevac of Essen, Germany, the competence center for VOD technology.

Fujian Fuxin orders VOD plant.

SMS Mevac will supply an X-eed® Duplex VOD facility to Fujian Fuxin Special Steel (part of Formosa Plastics Corporation), based in Zhangzhou, China. The aim of the project is to enable the production of austenitic and ferritic stainless steels. Fujian Fuxin plans to commence production with the new facility in the Zhangzhou works at the end of 2014. The VOD facility will be equipped with two tanks and two vacuum covers, a joint four-stage vacuum pump system with automatic vacuum pressure control (VOD-SC) and a common alloy storage and addition system. To protect the environment, the VOD unit’s vacuum pump system will include a gas cooler and an integrated bag filter system. The scope of supply covers the entire mechanical process equipment as well as the complete electrical and automation systems.
SMS Mevac supplied the secondary-metallurgy center to OMZ.
THE DREAM OF SECONDARY METALLURGY

The Russian steel producer OMZ relies on technology from SMS Mevac for the expansion of its secondary metallurgy facilities and the production of anti-corrosion steels with low and ultra-low carbon contents.

Since the beginning of 2012, a ladle-metallurgy center has been integrated into the Kolpino facilities of Russian steel producer OMZ. The equipment was supplied by SMS Mevac. In the interview, Professor Yuri Utochkin, Deputy General Director OMZ, and Vitaly Lotokhin, CEO Forpost Management, explain which objectives OMZ is pursuing with the new facility.

OMZ is a leading metals producer. To which sectors does OMZ supply steel?

Utochkin First of all, OMZ is active in the field of heavy machinery engineering. But also steelmaking has a long tradition at OMZ. The steelmaking capacities were established primarily to satisfy the needs of our own mechanical engineering activities. Our metallurgical production facilities are designed to produce individual, usually heavy forgings and castings, for example for the mining machinery and nuclear power plants as well as the petrochemical industries. All these industries need our special steels.

Our metallurgical production is characterized by a wide range of special steel grades. We produce several hundred different steel grades. The products weigh between 400 and 420 tons. In the future, we will even be able to make ingots weighing 500 tons. Currently, we can make forging ingots of up to 265 tons and castings of up to 150 tons.

Where do you see future markets for OMZ?

Utochkin One of our supply markets is the nuclear power industry. We are currently tendering for the completion of two blocks of a nuclear power plant in Temelín in the Czech Republic. We are continuing our successful collaboration with Rosatom within the framework of a power plant construction in China. We also have projects in India. Further plans concern projects in Vietnam, Turkey, Belarus and other countries.

Another segment of our portfolio is the manufacture of petrochemical containers. For the time being, our activities in this field are limited to the domestic Russian market. But we plan to also participate in the international market with these products.

As far as steel products are concerned, we are active in various regions, including China and Europe. We basically supply all kinds of rolls – the complete range up to 250 tons, from large work rolls through to heavy backup rolls for the rolling mills 5000. We also supply turbine rotors and hydraulic shafts, including latest-generation high-chromium rotors. It would be very interesting for us to supply rings, especially the large ones as used in the manufacture of nuclear reactors and containers for the petrochemical industry. So far we have only made these products for our own companies. For some time, we have been in negotiations with SMS Meer about the supply of a ring rolling plant.

By the way, when we speak about new equipment today, a key issue is how to continue the development of...

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<th>ARCESS® electric arc furnace</th>
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<tr>
<td>Commissioning</td>
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<tr>
<td>Heat size</td>
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<tr>
<td>Annual capacity</td>
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SMS Mevac also supplied the ladle-metallurgy center to Forpost Management. It consists of an LF, a VD and a VOD plant. A special feature of this center is its compact design combined with a flexible material flow. It makes it possible to cast ingots of up to 500 tons weight.
»THE NEW LADLE-METALLURGY CENTER FROM SMS MEVAC IS DEFINITELY A KEY PRODUCTION UNIT FOR US. IT BRINGS DOWN THE PRODUCTION COSTS AND INCREASES THE PRODUCTIVITY.«

Yuri Utochkin, Deputy General Director OMZ
We plan to add a second ladle furnace position in order to be able to produce ingots that weigh 500 tons or more.

The secondary metallurgy plant is already up and running. How important is this plant for OMZ and how satisfied are you with it?

Utochkin: Actually, when I joined OMZ twelve years ago, I had two visions. The first one was to build a modern electric steelmaking complex on the site of the Izhora works. We commissioned the 120-ton electric arc furnace supplied by SMS Siemag – “Demag” at that time – in June 2009, with the help and direct support of Forpost. My second vision was the construction of good and efficiently operating secondary metallurgy facilities. As to my second vision, we produce a great number of alloyed steel grades. Therefore, our goal was to build a plant which provides us with the possibility, firstly, of an efficient secondary-metallurgy treatment process and, secondly, of making corrosion-resistant steels with low and ultra-low carbon contents. The new ladle-metallurgy center from SMS Mevac is definitely a key production unit for us. It brings down the production costs, increases the productivity and guarantees that the required steel grades – primarily anti-corrosion grades – can be produced.

Lotokhin: Even though we had intensive discussions during the project implementation, we always worked towards a common goal and solution. I highly appreciate the effort demonstrated by project managers like Mr. Teworte. All in all, collaboration with the SMS group was very good, and we have two more high-tech plants now.

Are there any further plans for the future?

Utochkin: I’m convinced that the cooperation between all three partners will continue as effectively in the future. We are very pleased to be operating the largest plants of this type in Russia.

Click on this QR code to watch a short video on the OMZ plant: www.sms-siemag.com/qr/omz
NEW FURNACE, NEW MARKETS

Tata Steel placed an order with SMS Mevac to build a Vacuum Induction Melting (VIM) furnace at its Stocksbridge site in South Yorkshire, UK.

The Vacuum Induction Melting (VIM) furnace will enable Tata Steel to tap into new market opportunities and develop new innovative products for the aerospace and oil & gas industries. The cutting-edge VIM-X-eed® furnace will allow Tata Steel’s Speciality Steels business, which already supplies steel to aircraft engine and airframe makers, to further develop relationships with its customers and expand its product portfolio.

For Tata Steel, this is an important step towards consolidating its position as a leading supplier of high-purity steels to the global aerospace market. Commissioning is scheduled for early 2015. For this project at Stocksbridge, Tata Speciality Steels will work with Germany-based SMS Mevac, a major supplier of vacuum steelmaking equipment and other metallurgical plants.

Henrik Adam, Chief Commercial Officer of Tata Steel, says: “The addition of a VIM furnace to our asset base for aerospace steel production is an exciting prospect. It enhances our role as a partner for key customers who require highly specialized products. Our ability to support them is an important aspect of our role in the aerospace steels supply chain.”

Mark Broxholme, Managing Director at Tata Speciality Steels, adds: “While the business currently supplies small quantities of VIM-derived steel using ingots sourced from third parties, having our own manufacturing capability will greatly increase our scope for VIM sales. This is a clear signal to our customers that we are fully committed to the aerospace market for the long term.” The VIM production route involves melting high-purity steel and alloys in a crucible furnace, and then casting the purified liquid steel into ingot molds. The complete process takes place in a low-pressure vacuum chamber. As the entire melting and casting operation is conducted in an oxygen-free atmosphere, the resulting steel is very clean and has a very low gas content.

Alloying additions, also carried out under vacuum, allow for highly precise control of the steel’s chemical composition. The ingots produced will be further refined by processing through a Vacuum Arc Remelting (VAR) unit before being rolled or forged into products such as engine or landing gear components.

Michael Thiehofe, Managing Director of SMS Mevac: “We are happy to go ahead with Tata Steel with the execution of the concept for the VIM X-eed® unit. I am very much looking forward to seeing the plant in full operation in 2015, satisfying the requirements of this demanding, high-end market.”
»HAVING OUR OWN MANUFACTURING CAPABILITY WILL GREATLY INCREASE OUR SCOPE FOR VIM SALES. THIS IS A CLEAR SIGNAL TO OUR CUSTOMERS THAT WE ARE FULLY COMMITTED TO THE AEROSPACE MARKET FOR THE LONG TERM.«

Mark Broxholme, Managing Director Tata Speciality Steel
LIKE IN A GOOD MARRIAGE

The After-Sales Service of SMS Mevac provides valuable services to customers, so that their plants run even more efficiently. This is demonstrated by two examples from Spain.

A DH plant converted to RH technology has been in operation for 30 years. That is not at all old for secondary metallurgy units used in steelmaking. Especially, if they come from SMS Mevac. Even so, in these installations also, further potential is hidden for increasing the system’s availability and enhancing the steel quality. This potential is being developed by the after-sales service in cooperation with the customer.

Whereas in the past the supplier was in most cases not seen again once an installation had been commissioned, this has clearly changed over the last 15 years. This also applies to SMS Mevac. “For us, contact with the customer does not cease after commissioning,” says Ludwig Heinrichs, Senior Departmental Specialist for Technical Consultancy. “We work on solutions jointly with the customer such that the customer achieves the best possible output from their installations. We do not merely provide assistance in case of malfunctions and supply spare parts. We equally give advice when the system is running properly but the customer wishes to optimize it further. What matters is the closeness to the customer, as only this allows trusting and constructive cooperation to be established.”

For instance, the cooperation with Spanish steelmakers Gerdau Special Steel at the Basauri works in Bilbao and ArcelorMittal Asturias at Gijon is constructive and trusting. At Gerdau, SMS Mevac installed a 120-t twin-tank VD system in 1998 in cooperation with Sidernaval. In 2005, this plant was converted into a VD/VOD system. In addition to an oxygen blowing lance, the system was fitted with an in-line gas cooler/bag house unit (under vacuum atmosphere) for process gas cleaning and with equipment for boosting the
»FOR ME, THE SMS GROUP IS AN INDUSTRIAL GROUP WHICH OFFERS GLOBAL SOLUTIONS FOR THE METALLURGICAL PLANT SECTOR AND IS NEVERTHELESS VERY CLOSE TO THE CUSTOMER THANKS TO ITS NETWORK.«

Ludwig Heinrichs, Senior Departmental Specialist for Technical Consultancy, SMS Mevac

steam ejector pump performance in the form of additional water ring pumps and steam ejectors. “This conversion into a VD/VOD facility has allowed us to significantly increase the system availability. This would not have been possible without the know-how of the SMS Mevac engineers,” says Inaki Arberas Oses, Manager Steelmaking Plant at Gerdau Basauri.

In the years to follow, SMS Mevac provided assistance in the form of a number of inspection and troubleshooting assignments in the area of Gerdau’s vacuum system. This has in particular restored the performance of the steam ejector pump system.

Gerdau – steel for the FIFA World Cup 2014

Gerdau is the world’s biggest steel group for long products, based in Brazil.

With more than 45,000 staff and steel plants in 14 countries, the group produces more than 25 million tons of steel, which is mainly used in the construction and automobile industries. In Brazil, for instance, the steel is used for revamping the FIFA World Cup stadiums. In Spain, Gerdau operates five locations and focuses on the production of special-purpose steels.
Also at Gijon, 300 kilometers away, SMS Mevac after-sales service comes into play. As early as in the 1980s, a facility was installed at ArcelorMittal Asturias. In 2003, SMS Mevac replaced the electrical DH-type tank heating system (graphite-rod resistance heating system) by a gas/oxygen lateral burner. This was followed by conversion into an RH system in 2008. In this context, a new gas cooler was installed and, in addition, parts of the vacuum system were renewed and a vacuum pressure control system was fitted, all of which have improved the process. This has had a positive effect especially on tank skulling, which was reduced significantly, resulting in turn in greater system availability. With the RH plant, ArcelorMittal produces all kinds of rails that are used worldwide and exports them to all continents. "The conversion of the DH system into the RH process was a great success. Targets such as improved hydrogen degradation were even surpassed", according to José Sordo, Coordinator Maintenance Works LD-G-Steelmaking Plant, ArcelorMittal Asturias.

ArcelorMittal – wire rod for Formula 1 champions

ArcelorMittal ranks among the biggest steel-making and mining companies in the world, with a group-wide output of 100 million tons of steel each year. The locations are in 20 different countries. The mill in Gijon specializes in the production of plates, rails and wire rod. The wire rod, for instance, is used in tires, including those used in Formula 1 races – ArcelorMittal has therefore made a small contribution to the future Formula 1 champion.

"EACH STEELMAKING PLANT IS DIFFERENT. THIS IS WHY AFTER-SALES SERVICE IS SO IMPORTANT, TO CONSTANTLY MAINTAIN THE PLANTS IN A COMPETITIVE CONDITION. TO THIS END, THE ASSISTANCE OF THE SMS MEVAC ENGINEERS IS VERY IMPORTANT FOR US."

José Sordo, Coordinator Maintenance Works LD-G-Steelmaking Plant, ArcelorMittal Asturias
THE SMS GROUP IS A MARKET LEADER JUST LIKE ARCELORMITTAL. THE COMPANIES STAND FOR INNOVATIVE SOLUTIONS, LATEST TECHNOLOGIES AND CLEVER PEOPLE.«

Bernardo Gonzalez, Secondary Metallurgy Production Manager, LD-G Steelmaking Plant, ArcelorMittal Gijon

SMS Mevac was present in the following years also and assisted in further process optimization and in improving the refractory durability, which has resulted in even greater system availability. “The cooperation with SMS Mevac is very satisfactory. It is true that during the project handling our discussions are intensive and sometimes even controversial but in the end they are always successful. Like in a good marriage,” adds Sordo. His colleague Bernardo Gonzalez, Secondary Metallurgy Production Manager in the LD-G steelmaking plant, agrees: “The name SMS Mevac gives us confidence. It stands for high-level solutions even after commissioning.”

www.sms-mevac.com
SMS Mevac remains a convincing partner beyond commissioning

High-quality plants, competent service

SMS Mevac plants are in operation for 20 years or even longer – usually without problems. Nevertheless, secondary-metallurgy plant manufacturer SMS Mevac remains available to its customers even after the commissioning of a new plant. SMS Mevac’s after-sales service ensures competitiveness also of older production plants, as recent projects implemented at the steelworks of Engineering Steel Belgium (ESB) in Seraing, Belgium, and Tata Steel IJmuiden in the Netherlands demonstrate.

At Seraing in Belgium, a vacuum degassing (VD) plant supplied by SMS Mevac has been in operation for 30 years. During vacuum degassing, hydrogen and nitrogen are removed from the liquid steel – a precondition for the production of high-grade steels. ESB, since 2009 a part of Georgsmarienhütte Holding GmbH, supplies high-grade structural steels mainly to open-, round- and closed-die forging shops, round-rolling mills, manufacturers of railway components and to the tube and pipe industry. “What counts for us is quality, not quantity,” says Ralf Weidemann, Maintenance Manager at ESB. For this reason, in 2011 the steelmaker decided to modernize the VD plant – in cooperation with SMS Mevac. “SMS Mevac has exactly the experts we need. They are familiar with the process and the plant and know which measures will make production even more efficient.” Based on the analysis of the old plant, three vacuum boosters were replaced, the vacuum measuring system was renewed and the VD tank cover equipped with a new camera. “Thanks to the support by SMS Mevac, the plant...
now operates much more efficiently,” adds Weidemann. “I will certainly stay in contact with SMS Mevac, especially with technical consulting specialist Ludwig Heinrichs, because ESB can gain a lot from this personal relationship.”

Also Europe’s second largest steel producer, Tata Steel Europe, is convinced of SMS Mevac’s service. “The plants supplied by the SMS group are very reliable. Whenever called in or planning a service activity, the SMS engineers come up with a solution of how to improve the efficiency of a plant,” says Dr. Sander Willemsen, R&D specialist at Tata Steel. The RH-OB plant, which has been in operation for more than 25 years, was retrofitted with devices that reduce steam consumption. Moreover, some of the steam ejectors were replaced. “This will guarantee reliable production for the next 20 years to come,” says Hans-Peter Lieb, Manager Technical Commissioning of SMS Mevac, now responsible for the engineering of this revamp and, more than 25 years ago, a member of the commissioning team for the same plant. Also Tata Steel was satisfied with the work performance. “The SMS engineers did an excellent job in preparing the exchange of the plant components in collaboration with us. On-site commissioning took place so fast that we had hardly any downtimes. This was a job based on true partnership,” adds Willemsen, who would like to see the cooperation become even closer in the future, as SMS has the expert knowledge of the plant.

»SMS MEVAC IS SYNONYMOUS WITH “MADE IN GERMANY”, IN OTHER WORDS, HIGH-QUALITY PLANTS, RELIABLE AND COMPETENT PERSONNEL, PEOPLE WHO LIVE THEIR WORK.” «

Ralf Weidemann, Maintenance Manager at ESB
RH technology for producing premium steel - that’s what Shougang Qian’An Iron & Steel Co. Ltd., China, relies on. The company operates four secondary-metallurgy facilities from SMS Mevac. In this interview, Zhang Tao, Director of the Shougang Qian’An Steel Making Plant, explains the benefits of these facilities and the importance of maintenance.

All your secondary-metallurgy facilities are based on plants from SMS Mevac. How satisfied are you with the technology and the corresponding processes?

SMS Mevac has a very good reputation as a supplier of secondary metallurgy technology. Our cooperation goes back to the year 2006, when the first RH plant was built. We have worked with SMS Mevac in a highly constructive fashion.

How have the market and the demand for high-grade materials developed for Shougang?

Ever since the start-up of the first RH plant from SMS Mevac, the various melting processes that we have at Shougang have become increasingly sophisticated. During these years, the steel market has been characterized by little optimism, leading to a subdued demand also for RH products. Nevertheless, we are still convinced that in competition with other products there is a future for these high-grade steels. Therefore the continuous operation of the RH plants and the constant improvement of vacuum metallurgy will remain the basis for our future development.

For which products are these steels used?

Today, the Shougang group ranks among the 500 leading companies of the world. Being a young steel producer, Shougang Qian’An makes 286 products in 20 steel groups, including electric steel and pipe steel grades as well as steel for car bodies and high-strength structural steel. Our products are mainly used in key projects, for example, in high-capacity transformers or the second West-East gas pipeline.

How great is the maintenance effort?

Works maintenance is centrally organized for each meltshop, based on the type of installed equipment and operating state. We have two types of maintenance: On the one hand, we have scheduled maintenance activities [random checks], which are laid down in a
yearly schedule and performed by specialists. The other type is relevant for short-term problems occurring during production. These are taken care of by on-site maintenance teams.

What do you appreciate about the services rendered by SMS Mevac?
We have made the experience that, after commissioning of the plants, SMS Mevac provides excellent service in terms of on-site coordination, supervision and training. We have been very impressed by the team’s work attitude and the discipline, especially when assisting us during trouble shooting and providing support in documentation matters. We are in close contact.

To date, SMS Mevac has supplied four RH-TOP plants (three of them of the Duplex RH-TOP design) to Shougang. The photo shows the first plant supplied in 2006. A further Duplex RH-TOP plant was built at QGM, also a member of the Shougang Group.

www.sms-mevac.com

Shougang Group
was founded in 1919. Today, it is one of China’s major steelmakers with an annual steel production of more than 30 million tons.
In early 2014, SMS Mevac received an emergency call from Eisenhüttenstadt, Germany. ArcelorMittal Eisenhüttenstadt had observed that the evacuation performance of its RH plant was deteriorating. SMS Mevac rendered immediate help.

“The plant is healthy again” was how ArcelorMittal Eisenhüttenstadt expressed its satisfaction in an e-mail message to Ludwig Heinrichs, Technical Service Specialist of SMS Mevac, about the service he had rendered to fix the problem occurring at the company’s RH plant.

What had happened? For several weeks, ArcelorMittal Eisenhüttenstadt had been observing that the evacuation capacity of the RH plant was deteriorating. “We were no longer able to set the steel analysis with the necessary accuracy. Drawing on our experience, we did some troubleshooting and were actually able to fix some deficiencies. However, all our efforts to solve the evacuation problem failed,” explains the customer.

The steels made by ArcelorMittal Eisenhüttenstadt include high-alloy grades, low-carbon grades and steels with high alloys contents for electrical engineering applications. More than 30 percent of the heats produced depend on the RH plant. Here, the basis is set for the production of high-quality steels which are used, for example, in automotive engineering. The plant is indispensable for making deep-decarburized and high-alloyed grades. ArcelorMittal performed several manipulations on the pump control system of the RH plant in order to be able to treat any steel at all. However, in the long run, that situation would have been intolerable. Therefore, the steelmaker called on SMS Mevac. Their experts had already completely renewed the vacuum system back in 1999/2000.

Service expert Heinrichs asked ArcelorMittal to describe the problems. Although the steelmaker forwarded all available information to him, it was difficult to make a remote diagnosis. Therefore, Heinrichs decided to visit the site and see for himself what the problem was. Heinrichs and experts of ArcelorMittal jointly performed another treatment during which the phenomenon occurred again. By measurements with the plant in the cold run, the source of trouble was localized. It was in one of the pipelines. The next day, that pipeline was opened and the problem fixed. The very next heat was perfect again. “Thanks to the know-how of SMS Mevac, the RH plant was running excellently again in no more than 24 hours,” commented the customer.
Eisenhüttenstadt is Germany’s youngest city. It was established as a planned city in the 1950s together with the metallurgical combine. The iron and steelworks, the former metallurgical combine VEB Eisenhüttenkombinat Ost and later on EKO Stahl GmbH, today belongs to ArcelorMittal. It is the most important provider of jobs in the region. The RH plant was built as early as in 1984 by then Standard Messo. In 2001, also the hot-metal desulphurization plant was revamped by SMS Mevac.
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