

The AIST Oxygen Steelmaking Technology Committee visited voestalpine Donowitz on 6 November 2012.



The AIST Oxygen Steelmaking Technology Committee (OSTC), seeking to expand its network and knowledge within the international BOF community, embarked on its 4th Oxygen Steelmaking Study Tour on 4–9 November 2012 to Europe. Included in the study tour were visits to three oxygen steelmaking facilities, two original equipment manufacturers, a refractory brick production facility and a technical exchange with the German BOF steel producers.

AIST 2012 Oxygen Steelmaking Technology Committee European Study Tour

On 4 November 2012, OSTC members from Canada, the United States, Argentina, Germany and Austria met in Linz, Austria, to begin the Study Tour. Siemens Metals Technologies GmbH welcomed the delegates with a tour of Linz and dinner at the historic Postlingberg Schloessel, which overlooks the city of Linz.

On 5 November 2012, Siemens again hosted the delegates at their world headquarters in Linz, immediately adjacent to voestalpine Linz GmbH and the newly opened Stahlwerk Museum. Johannes Spiess and Gerard Wimmer welcomed the group and provided an overview of the latest in Siemens technology available for oxygen steelmaking production. Siemens Metals Technologies provides a variety of new technologies, such as: wireless-weighted scrap buckets, SIMETAL Ignition Guard, LiquiRob testing systems, ConLink for vessel suspension, automated horizontal measuring systems for vessel turndown testing, and the Dynacon Offgas Measurement system for endpoint prediction.

Killian Jandl, voestalpine's vice president — steelmaking, greeted the delegation at the voestalpine Stahlwelt exhibition and museum for lunch. Following lunch, Mr. Jandl provided an overview of the steelmaking facility in



Killian Jandl (front left), vice president — steelmaking, was presented with a plaque of appreciation following the OSTC's visit to voestalpine Linz.

Linz. Stahlwerk No. 3 has been producing steel since its commissioning in 1973. Three blast furnaces provide the hot metal consumed by the three LD converters, which produce 175 tonnes per heat. Secondary steel refining is accomplished via three LMFs and three RH degassers, and solidification is through one of four continuous casters. Producing 5.2 million tonnes of steel in 2012, voestalpine Linz GmbH primarily serves the automotive industry, but its overall production is spread evenly between grades of ultralow-carbon (ULC), high-strength low-alloy, high-silicon, structural, and low- and high-carbon steels.

voestalpine Linz continues to upgrade its LD facilities with the latest technologies. Since 2000, the LD facility has installed two LMFs, two RH degassers, three casters, a third desulfurization facility and larger LD vessels. Future plans include a fourth RH degasser, a fourth LMF, an additional caster (designated as Caster No. 8) including a scarfing area, tundish prep area and an additional casting crane.

The evening of 5 November included a tour, hosted by TBR Casting Technologies, of the Radwerk IV Industrial Landmark. The Radwerk site first began producing blast furnace iron in the region in the 16th century and ended production in the early 20th century. The tour showcased the difficult conditions and the dangers of producing iron and steel prior to today's advanced processes. Following the tour, the delegation was greeted by Heinz Rumpler, managing director, TBR Casting Technologies, and Dr. Harald Holzgruber, chairman, Inteco Technologies, and enjoyed the local cuisine at Zum Schwarzer Adler in Vordernberg, Austria.

On 6 November 2012, the delegation was invited by Erich Doring, process manager — meltshop, voestalpine Donawitz GmbH, to visit the steelmaking and processing operations at the Donawitz facility. Voestalpine Donawitz has two blast furnaces supplying the iron to the two LD converters in the steelmaking facility. The steelmaking facility can produce 72 heats per day with a heat size of

On Monday, 5 November 2012, the OSTC visited the casthouse of the Radwerk IV furnace, which first began producing iron in the 1500s.



Stahl 2012:

Future Starts With Steel

Stahl 2012, the annual meeting of the Steel Institute VDEh and the German Steel Federation, was held on 8–9 November at Messe Düsseldorf in Düsseldorf, Germany. Approximately 3,000 attendees from around the world gathered this year for the event, including senior representatives from both business and politics. For many customers, equipment manufacturers and suppliers to the steel industry, as well as journalists, Stahl is a prime source of information on the state of the industry and the latest technologies impacting steelmaking. This year's theme was "Future Starts With Steel."

On 8 November, "steel dialogues" were held in the Messe Düsseldorf concurrently with a steel-related exposition. The technical presentations and discussions focused on current technical and economic issues. The topics of the "talks about steel" included:

- Energy Turnaround: Challenges and Opportunities for Industry
- Creating the Future With Stainless Steel
- Resource Efficiency and Life Cycle Assessment
- Shortage of Skilled Workers Challenges and Strategies
- Technical Progress in Plant Engineering and Forming Technology to Increase Efficiency and Quality
- Raw Materials and Energy — Basis for Efficient Steel Metallurgical Processes

Following the sessions, members of the German Steel Federation and the Steel Institute VDEh held their annual meeting.

Stahltag, or International Steel Day, took place on 9 November, highlighted by a video message from Peter Altmaier, Federal Minister for the Environment, Nature Conservation and Nuclear Safety for Germany. "Steel is the material of the energy transition. I want to keep it that way, and I want to see this steel produced in Germany in the future," he said. The World Steel Association's Economics Committee chairman and host of the event, Hans Jürgen Kerkhoff, noted that the current energy revolution can only succeed with steel that is more competitive to the needs of industrial structures. The annual meeting of the Stahltag concluded with talks by several other prominent speakers and guests.

For more information about Steel Institute VDEh and Stahl 2012, visit www.stahl-online.de.

65 tons. Annual production is 1.65 million tonnes per year, supplying steel for wire products, rail, bearings, seamless tube and other long products. voestalpine Donawitz produces the longest single-strand rail in the world. Similar to its sister facility in Linz, voestalpine Donawitz continually seeks to increase the efficiency of its steelmaking operations. An additional desulfurization station, a VD ladle degassing station, equipment additions to the LMF and degassers, and improved maintenance techniques have improved facility production since 1997. The LD converters utilize 20 tons of scrap and 55 tons of hot metal to produce one heat of steel after a 13-minute oxygen blow. The waste gas from the converters is captured for power generation, and the dust from the precipitator is recycled back into the converters to reduce landfill waste.

A short trip was then made to Veitsch, Austria, for a visit to the RHI Refractories brick manufacturing facility. Established in 1899 in Veitsch, Veitche Magnesitwerke AG began producing magnesite refractories for the steel industry. Today, RHI Refractories produces refractories for the steel industry and the cement industry from the facility in Veitsch. Mr. Michael Glaser, director of product management secondary metallurgy, and Mr. Christof Jandl, process technology and systems manager, hosted the tour of the brick production

[RHI Refractories in Veitsch, Austria, was one of the stops on the 2012 OSTC Study Tour.](#)





Yun Li, U. S. Steel Research and Technology, and Mike Strelbisky, A.H. Tallman Bronze, in the BOF pulpit at ArcelorMittal Gent observing the process automation system.



The AIST OSTC met with the VDEh Oxygen Steelmaking Committee at the Stahl Institute VDEh in Düsseldorf, Germany, on 7 November.

facility and the bulk magnesite mix facility. Included in the tour were raw material preparation, hydraulic pressing and the firing/baking facilities. Following the tour, Mr. Ulf Andersson, vice president product management steel linings, and other RHI Refractories representatives hosted the delegation for dinner at the historic Altes Zechhaus, founded in 1549 in Gumpoldskirchen, Austria.

On 7 November 2012, the delegation traveled to Düsseldorf, Germany, for the second half of the Study Tour. SMS Siemag AG welcomed the group to its headquarters in Düsseldorf for a brief technical exchange. Dr. Jochen Schlüter, vice president — special technologies, provided an overview of SMS Siemag AG and the many aspects of steelmaking technologies which the company provides throughout the world. Dr. Hans Jürgen Odenthal presented the latest SMS Siemag technology for BOFs, such as CFD applications, top lance

calibrations systems, opto-acoustic slopping detection, and automatic bottom stirring. Mr. Craig Priday, general manager sales, SMS Mevac, presented the latest technologies for ladle refining. Thilo Wübbels, commercial director — SMS ELEX, presented dedusting technologies, and Dr. Christian Fröhling, general manager energy and environmental technology, explained how waste products from steelmaking can be used to generate energy and reduce environmental waste.

The afternoon of 7 November 2012 was dedicated to the joint meeting between the OSTC and the VDEh Oxygen Steelmaking Committee. This was the third such meeting between the two committees, and each meeting is composed of extensive discussion on the latest BOF technologies and practices from Germany, the Netherlands, Belgium, Austria, the United States, Canada and Argentina. Presentations were given on the topics shown below:

Strategies for Coping With Vessel Slopping

H. Arnold, Hüttenwerke Krupp Mannesmann, Germany

K. Clark, ArcelorMittal Indiana Harbor No. 2 SP, USA

M. Hartwig, Tata Steel IJmuiden, The Netherlands

J. Perez, Ternium Siderar, Argentina

C. Lindner, ThyssenKrupp Europe AG, Germany

Charging Alternative Ferrous Materials (DRI, HBI, Scales, Skull)

C. Lindner, ThyssenKrupp Europe AG, Germany

K. Clark, ArcelorMittal Indiana Harbor No. 2 SP, USA

J. Lash, United States Steel Corporation, USA

J. Brockhoff, Tata Steel Strip Products IJmuiden, The Netherlands

Procedures for Using Hot Metal With Varying Si, P and S Levels

J. Brockhoff, Tata Steel Strip Products IJmuiden, The Netherlands

K. Clark, ArcelorMittal Indiana Harbor No. 2 SP, USA

Y. Li, United States Steel Corporation Research & Technology, USA

J. Olszewski, United States Steel Corporation, USA



The 2012 OSTC Study Tour concluded with a tour of ArcelorMittal Gent, Belgium.

The evening concluded with a joint dinner between the two committees hosted by SMS Siemag AG at the Im Fühnschen in Alstadt, Düsseldorf, Germany.

Following the Stahl 2012: Future Starts With Steel event on 8 November 2012, the delegation traveled to Gent, Belgium, on 9 November 2012, to visit the renowned ArcelorMittal Gent facility. Hendrik Vansteenkiste, support manager — steel shop, greeted the delegation upon their arrival. Wim Van Gervan, CEO, hosted the delegates to a traditional Belgian lunch. Also in attendance were Geert Verbeeck, head — steel shop, and Frederik Engels, support manager — steel shop. Mr. Vansteenkiste provided an overview of the ArcelorMittal Gent facility. Of particular note, in 2011, ArcelorMittal Gent was 0.5 below the average injury frequency rate for all of Belgium.

ArcelorMittal Gent has a cokemaking facility, sinter plant, two blast furnaces, the steelmaking facility, hot strip mill, three pickle lines and two tandem mills, batch and continuous annealing, electro- and hot-dip galvanizing and an organic coating line. Overall, the site produces approximately 5 million tonnes per year, 40% of which is automotive related and 70% is shipped to the immediate region. The facility has approximately 4,700 employees, and through utilization of blast furnace and BOF waste gases, generates 300 MW of power.

The steelmaking facilities feature a very compact layout, which provides short lead times and reduced energy losses during steel processing. The BOF shop also utilizes different routes for ULC and HSS steels, enabling the process routes to be independent of one another. There are two converters producing 300 tonnes/

heat every 25 minutes. ArcelorMittal Gent has an extremely high level of automation for its steel production. A statistical process model automatically controls the lance height, oxygen flowrate, bottom stirring and any in-blow additions, all of which improves quality control and reduces the need for any employee to perform duties in a hazardous environment. These models are utilized in 100% of the heats. Heats produced by the BOF are either sent to the ULC route (RH degasser and caster No. 2) or to the HSS route (LMF and caster No. 1).

The Study Tour was complete following the ArcelorMittal Gent visit. The final evening was sponsored by Küttner GmbH at the Brauerei Schumacher in Altstadt, Düsseldorf. The AIST Oxygen Steelmaking Technology Committee would like to thank the following companies for hosting or sponsoring functions during the 2012 Oxygen Steelmaking Study Tour: Siemens Metals Technologies, voestalpine GmbH, TBR Casting Technologies, INTECO Technologies, RHI AG, SMS Siemag AG, VDEh and the Stahl-Institut, ArcelorMittal Gent and Küttner GmbH & Co. KG. ♦