

2026 AIST Brazil Caster Study Tour Recap



The AIST Continuous Casting Technology Committee strives to provide its members with unique opportunities for technical exchange, and the caster study tour extends that mission beyond regular committee meetings. Previous tours to Germany (2015), Japan (2017) and South Korea (2024) gave participants firsthand exposure to casting operations, maintenance practices, and quality systems while offering valuable opportunities to compare technologies and operating philosophies outside the United States and beyond their own organizations.



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Introduction

In 2025, the committee evaluated several potential destinations for the next study tour, comparing prospective host companies using publicly available information. Brazil was ultimately selected because of its diverse range of steelmaking and continuous casting operations, providing an excellent opportunity to observe different technologies, operating practices and maintenance philosophies. The final itinerary included visits to Ternium Brazil, ArcelorMittal Resende, Vallourec Jeceaba and Usiminas Ipatinga.

The tour took place from Sunday, 12 April, through Friday, 17 April 2026. Twelve participants representing both steel producers and industry suppliers attended, including representatives from United States Steel Corporation, ArcelorMittal, voestalpine, Ternium, Vallourec, Vesuvius, VUHZ and Reuning-McKim.

The caster study tour provides participants with the opportunity to visit steelmaking operations in other countries and compare safety culture, operating practices, technical approaches and continuous improvement initiatives. Beyond the technical program, the experience also encourages professional networking, cultural exchange and discussion among industry peers while providing broader perspective on steel production around the world.

The Tour

The group gathered on the evening of 12 April for a welcome dinner sponsored by Vesuvius at a traditional Brazilian steakhouse. The evening provided an opportunity for participants to become acquainted, discuss expectations for the week ahead and share their first impressions of Rio de Janeiro.

The tour officially began the following morning with a visit to Ternium Brazil.

Ternium Brazil

Upon arriving at Ternium Brazil's main office, the group was welcomed by the chief executive officer Titus Schaar, who encouraged participants to look beyond the technology and carefully observe the plant's safety culture and operating practices. Franz Ramstorfer, well known to many AIST members through his regular participation at AISTech, served as tour host and guided the group through the steelmaking and continuous casting facilities while highlighting key aspects of the operation.

A significant advantage for the non-Portuguese-speaking participants was the presence of four native Portuguese speakers within the tour group, whose assistance greatly facilitated communication throughout the visit, particularly during informal discussions outside the scheduled presentations.

Ternium Brazil was established after Ternium acquired the former thyssenkrupp Steel assets in 2017. Originally



◆ Sugarloaf Mountain with a breathtaking view of Rio de Janeiro.

constructed as Companhia Siderúrgica do Atlântico (CSA), a joint venture between thyssenkrupp Steel and Vale, the fully integrated facility began operations in 2010. The site includes coke ovens, a sinter plant, two blast furnaces, a steel shop and a deepwater seaport used to receive raw materials and ship slabs. Because the site does not include a hot strip mill, slab production is its primary downstream product.

The steel shop is equipped with two basic oxygen furnace (BOF) vessels, a twin RH degasser, two LTS reheat and stirring stations, and two dual-strand slab casters, providing an annual production capacity of approximately 5.5 million metric tons with a 350-metric-ton heat size.

The tour included both the BOF shop and continuous casting facilities. As a relatively modern operation, Ternium Brazil incorporates several innovative design features. One of the most notable is the close proximity of the blast furnaces to the BOF shop, allowing hot metal to be tapped directly into ladles and transported by specialized carriers for desulfurization. This arrangement eliminates the need for conventional torpedo cars while reducing material handling between ironmaking and steelmaking.

The two dual-strand slab casters, supplied by Primetals Technologies, are capable of producing slab thicknesses of 200, 220 and 255 mm. Both machines are equipped with Vesuvius tundish robotics systems that improve operator safety by automating ladle shroud handling,

powder addition, and temperature measurement around the ladle and tundish. Parsytec slab surface inspection systems are also installed on both casters.

A technical exchange immediately followed the plant tour, providing an opportunity to meet the casting technical staff and discuss a broad range of operating practices. Particular emphasis was placed on emergency response procedures and overall safety philosophy, while additional discussion focused on caster maintenance strategies and slab quality monitoring.

One observation from this first visit, reinforced throughout the remainder of the tour, was the significantly larger technical support organizations assigned to steelmaking and continuous casting than are typically found at many U.S. operations. Process engineers, automation specialists and metallurgical personnel played highly visible roles in day-to-day operations at each facility visited.

The first day concluded with a traditional Brazilian dinner hosted by SMS group.

ArcelorMittal Resende

The second plant visited was ArcelorMittal Resende, a rebar mini-mill commissioned in 2009 with an annual production capacity of approximately 1 million metric tons. The steelmaking facility, supplied entirely by Danieli, includes an electric arc furnace (EAF), ladle metallurgy furnace (LMF) and a 6-strand billet caster.



Downstream operations include two wire rod mills capable of producing finished products ranging from 5.5 to 10 mm in diameter.

Although the majority of production consists of silicon-killed steels, the operation has recently expanded into special bar quality (SBQ) automotive-grade products. Plant personnel also highlighted an impressive safety milestone of eight consecutive years without a recordable safety incident.

One safety practice that attracted considerable attention was the controlled access system used throughout the steel shop. Swipe-card entry points restricted access to designated operating areas, helping prevent unauthorized entry while reducing personnel exposure to potential hazards.

Following the plant visit, the group began the next stage of the journey toward Vallourec Jeceaba, traveling approximately halfway to the historic town of Tiradentes. Tiradentes offered a welcome opportunity to experience Brazilian history and culture. The town is well known for its preserved colonial architecture, narrow cobblestone streets and numerous historic churches, including its iconic hilltop cathedral overlooking the city.

The evening concluded with a dinner sponsored by VUHZ before a late arrival at the hotel. The following morning, participants had a brief opportunity to explore the town before departing for Vallourec Jeceaba.

Vallourec Jeceaba

The visit to Vallourec Jeceaba was one of the most anticipated stops of the study tour and was made especially valuable by the participation of Mariana Modesto, Vallourec's director – Steelmaking Process Community, whose familiarity with the operation provided additional insight throughout the visit.

The group was welcomed by the steel plant manager before attending two introductory presentations describing the facility and its operations. Vallourec Jeceaba was commissioned in 2011 as a joint venture between Vallourec and Sumitomo Metals (now Nippon Steel), and produces seamless pipe for demanding oil and gas applications.

Although the integrated site includes a blast furnace, it has remained idle since early 2026 because of market conditions. Current steel production is based on a Tenova Consteel electric arc furnace operating with a charge mix containing approximately 30% pig iron. The steel shop also includes an LMF, vacuum tank degasser (VTD) and a 5-strand bloom caster, providing an annual steelmaking capacity of approximately 1 million metric tons.

As expected, both the technical presentations and plant tour focused heavily on clean steel production and best practices for bloom surface and internal quality. The bloom caster, supplied by SMS Concast, is designed to produce five round bloom sizes: 180, 220, 270, 310 and 406 mm.

Operating a 5-strand bloom caster presents unique challenges in tundish design, particularly with achieving balanced flow distribution to each strand. Plant personnel





◆ Tiradentes church.



◆ Vallourec Jeceaba.



◆ Vallourec Jeceaba.

discussed several approaches used to optimize tundish performance while maintaining consistent product quality across all strands.

One particularly impressive feature of the operation is its comprehensive product traceability system. Every pipe produced in the finishing mill undergoes ultrasonic inspection, and complete traceability is maintained from the finished pipe back to the original bloom. This capability greatly enhances the investigation of casting-related quality issues and enables rapid implementation of corrective actions whenever necessary.

By the conclusion of the visit, the day had grown late, and another 2-hour bus ride remained before reaching Belo Horizonte. The group departed Vallourec with sincere appreciation for both the hospitality extended by the hosts and the open technical discussions that characterized the visit.

Belo Horizonte served as an overnight stop before the final plant visit. Participants visited the Gerdau Technical Museum and enjoyed lunch at a traditional public market before beginning another 6-hour journey to Ipatinga. Upon arrival, the group was welcomed by its dinner host from Tozato.

Usiminas Ipatinga

Usiminas Ipatinga, the final stop on the study tour, occupies a significant place in the history of the Brazilian steel industry. Established in 1956 with substantial technical and financial support from Japan, it was the first integrated steel mill built in Brazil. Since 2023, Ternium has held a controlling ownership interest in the company, succeeding Nippon Steel as the majority shareholder.

The Ipatinga facility is a fully integrated steel works strategically located near major iron ore reserves, including one of the largest deposits in Brazil. The site's two steelmaking shops have a combined production capacity of approximately 7 million metric tons per year. The visit included the plantwide operations center, environmental control center, research and development laboratories, and Steelmaking Shop No. 2.

One of the most impressive aspects of the operation was the plantwide operations center. Representatives from each major production department work together in a single control room, enabling rapid communication, collaborative decision-making and immediate resolution of production issues. Large digital displays provide real-time operating information from across the facility, allowing personnel to coordinate production schedules and optimize plant performance.

The environmental control center demonstrated the company's commitment to responsible environmental stewardship. Because the plant is located adjacent to the city of Ipatinga, continuous monitoring of emissions and local weather conditions is critical. Real-time environmental data enable operators to respond proactively

to changing atmospheric conditions and minimize the potential impact of plant emissions on surrounding communities.

The research and development laboratories employ approximately 84 researchers dedicated to both process improvement and product development. During the tour, participants visited several laboratories and received detailed presentations describing current research activities and the analytical capabilities supporting plant operations.

Steelmaking Shop No. 2 is equipped with two basic oxygen furnace vessels, two RH degassers, two LTS reheat and stirring stations, and two dual-strand slab casters, providing an annual production capacity of approximately 5 million metric tons. The casters produce slab thicknesses of 200 and 250 mm and supply a wide range of downstream flat-rolled products.

The technical exchange highlighted several major capital projects completed since 2023. Among the most significant was the complete relining and modernization of Blast Furnace No. 3 using the latest available technologies, resulting in what plant personnel described as one of the most modern blast furnaces in the Americas.

During the same period, Casters 1 and 2 in Steelmaking Shop No. 2 underwent extensive structural restoration and complete strand realignment. The projects addressed corrosion that had accumulated over years of operation while restoring machine geometry and improving long-term casting reliability.

The tour concluded with an open technical discussion covering equipment modernization, operating practices and future development plans. Participants expressed sincere appreciation for the hospitality extended by the Usiminas team and for their willingness to openly share operational experiences and technical knowledge.

Summary

The 2026 AIST Brazil Caster Study Tour provided participants with valuable insight into one of the world's major steel-producing countries during a period of significant market uncertainty. Although Brazilian producers continue to face increasing pressure from imported steel, each host organization demonstrated a strong commitment to continuous improvement and openly shared both operational successes and ongoing challenges. The willingness of every company to discuss its practices and answer questions candidly was one of the tour's greatest strengths.

Several common themes emerged throughout the week:

Safety

Safety was consistently identified as the highest operational priority at every facility visited. Notable observations included:



◆ Usiminas Ipatinga.



◆ Usiminas Ipatinga plantwide operation control room.

- Well-developed emergency response procedures and regular training for continuous casting incidents.
- AI-assisted camera systems used to identify hazardous conditions and monitor environmental compliance.
- Controlled access systems for high-risk operating areas.
- Strict limitations on cell phone use within production facilities.
- Comprehensive personal protective equipment, including flame-resistant hoods and spats.

People

Perhaps the most striking observation was the investment made in technical personnel. Compared with many North American steel plants, Brazilian operations employed substantially larger groups dedicated to process engineering, automation, metallurgy and continuous improvement. Young engineers were highly visible throughout the facilities, and women were well represented in both technical and management positions.

Operations

Despite differences in equipment and product mix, every operation maintained a clear focus on the same core performance indicators:

- Safety.
- Quality.
- Environmental performance.
- Productivity.

Operational decisions and improvement efforts were consistently aligned with these key performance objectives.

Continuous Improvement

Each facility demonstrated a disciplined, data-driven approach to continuous improvement.

Rather than pursuing projects based solely on experience or intuition, engineering teams emphasized detailed process analysis to identify the most impactful improvement opportunities. Throughout the tour, it became evident that effective use of operational data is increasingly recognized as a critical component of successful modernization and long-term competitiveness.

Conclusion

Caster study tours provide far more than an opportunity to observe steelmaking and continuous casting operations. They create an environment where participants can exchange ideas, establish professional relationships and gain valuable perspective on different approaches to solving common technical challenges.

Traveling across Brazil by bus offered an experience that extended well beyond the steel plants themselves. Participants gained a firsthand appreciation of the country's geography, infrastructure, history and culture while observing the diversity of the regions that support one of the world's largest steel industries. These shared experiences strengthened professional relationships and enriched the technical discussions that continued throughout the week.

The author extends his sincere appreciation to the dinner sponsors — Vesuvius, SMS group, VUHZ, Reuning-McKim and Tozato — whose generous hospitality enhanced both the technical and cultural aspects of the study tour.

The author also thanks U. S. Steel management, especially Tony Faulds, for encouraging active participation in AIST committee activities and for supporting attendance on this study tour.

After participating in four AIST caster study tours, I remain convinced that these experiences represent one of the most valuable professional development opportunities available within the industry. The opportunity to observe different operating practices, exchange ideas with international colleagues and return home with new perspectives benefits not only the individual participant but also the organizations they represent. Hopefully, future tours will encourage even greater participation from both industry professionals and their management teams. ♦