BIG RIVER STEEL:

AMERICA'S NEWEST STEEL MILL

By Amanda L. Blyth and Kenneth W. Landau

BIG RIVER STEEL

Situated on 1,300 acres in Osceola, Ark., USA, Big River Steel was thought by the late John Correnti to be "Steel Mill Heaven." Its location in the fastest-growing steel-consuming region in the U.S. is ideal, and its proximity to the Mississippi River and direct access to the BNSF Railway indeed lighten the load of shipping and logistics.

The lineage of Big River Steel can be traced from the start-up of mills such as Nucor Steel–Berkeley in Huger, S.C., and the former SeverCorr plant (now owned by Steel Dynamics Inc.) in Columbus, Miss. The idea of the "Flex Mill™" was conceived by Correnti to maximize efficiency while broadening product offerings, including advanced high-strength steels (AHSS) and electrical steels. Where older mini-mills were constructed prior to the advent of AHSS grades, and now require extensive redesign and retrofitting to produce AHSS, Big River was designed and equipped for these demanding grades.

Plans for the 1.6-million-ton-annual-capacity mill were announced in 2013, and construction broke ground in July 2014, with an official ceremony on 22 September 2014. The long-awaited first coil was produced in December 2016 in its first try and in only 18 hours from first arc to coil. The coil was sold to nearby Atlas Tube, a division of Zekelman Industries Inc. The proceeds were donated to the Wounded Warrior Project.

In its first month, Big River reached a production total of 65,000 metric tons (71,650 tons), and its operational capacity was greater than 50%.

The SMS group was selected to supply the overall footprint of the plant.

Jim Bell, Big River's manager of construction and board member recalled the early stages of the development of the mill. "A handful of people spec'd out the mill. We went to SMS and said 'Build us a mill.'"

With Big River's criteria on output, product range and capabilities in hand, SMS provided:

- Gas cleaning plant.
- Electric arc furnace (EAF).
- Twin-station ladle treatment furnace (LTS).
- Ruhrstahl-Heraeus (RH) degasser.
- Compact Strip Production (CSP®) plant.
- Coupled pickling line and tandem cold rolling mill (PL-TCM).
- Batch annealing furnaces.
- Skinpass mill.
- Coupled universal annealing and galvanizing line.

Big River's current and planned offerings include:

- Deep-drawing and extra-deep-drawing grades (DS, DDS, EDDS, IF).
- Commercial steel; low-, medium- and high-carbon grades.
- Structural steel and COR-TEN grades.
- High-strength, low-alloy (HSLA) steels.
- Advanced high-strength steel (DP, CP, MS, FB).
- Cold-rolled motor lamination steels (CRML).
- Non-grain-oriented semi-processed steel (NGO SP).
- Quenched and tempered, abrasion-resistant and pressure vessel grades.
- Pipe grades (API, sour gas resistant (HIC) and oil country tubular goods).

NICHE MARKETS

"There's not enough AHSS in the U.S.," says Mark Bula, chief commercial officer at Big River, who added that much of the AHSS in the U.S. today is imported from Asia and Europe. Big River wants to bring manufacturing back to North America.

One of the fundamental questions the team at Big River asked itself was "What's good for the industry?" Those at Big River say its growth will be sustained by embracing technology and partnering with others in the industry. This sentiment is a tenet of Big River's main investor, Koch Industries. By planning for future expansions that will enable it to produce a wider range of materials and serve the automotive industry, Big River is positioning itself for technical collaboration to help the U.S. steel industry compete with the rest of the world.

Because of its interest in producing automotive grades, in 2016 Big River Steel got involved in the Center for Collision Safety and Analysis (CCSA) at George Mason University, Fairfax, Va., USA. CCSA brings together a team of scientists and engineers focused on using advanced technology to understand collisions involving transport vehicles and developing means to avoid or mitigate them. While it is mostly automakers that have teamed up with CCSA in the past, Big River is the first steel producer to do so. In addition, the company is looking at ways to advance steel research in more of an incubator model involving industry, government and academia, including auto steel research at nearby Arkansas State University, Arkansas Northeastern College and the Colorado School of Mines.

Another market Big River is preparing to serve is electrical sheets. Its initial focus will be on motor lamination steels, producing all nine grades in Phase 1. And thanks to the capabilities of its temper mill, Big River will produce semi-processed

TABLE 1: PRODUCT CAPABILITIES

	Thickness (mm)	Width (mm)	Thickness (inch)	Width (inch)
Hot-rolled black	1.4–25.4	915–1,980	0.054–1.0	36–78
Hot-rolled pickled and oiled	1.4–4.1	915–1,880	0.054–0.160	36–74
Cold-rolled	0.3–2.4	915–1,880	0.012–0.128	36–74
Galvanized	0.3–2.4	900–1,855	0.012–0.128	35.5–73.5

non-grain-oriented silicon steels. Potential expansions will allow for a wider variety of silicon steel offerings.

To serve the pipe and tube industry, the Flex Mill is able to achieve advanced physical properties in wider and heavier high-strength grades. Big River's product range is also intended to serve the agricultural, heavy equipment and construction industries, to name a few.

STEELMAKING OPERATIONS

The Big River meltshop was designed with interstitial-free, low-alloy, advanced high-strength steel and non-grain-oriented electrical steels in mind. The DC electric arc furnace is charged with 180 tons of material consisting of a single bucket of scrap and pig iron supplemented with roof-fed hot briquetted iron (HBI), supplied by voestalpine Texas LLC. The furnace power supply is capable of providing 160 MW continuously to a single 32-inch graphite electrode, with the capability of producing up to 22 heats every 12 hours. The shell has four oxy-fuel sidewall injectors and four carbon injection ports. The furnace upper shell, roof and fourth-hole elbow are all spray-cooled.

From the arc furnace, heats are tapped into one of two ladle cars arranged on a V-shaped track system that allows the ladles to be transferred to the twin-station ladle furnace without the use of a crane. The twin-station ladle furnace provides the flexibility to treat two heats simultaneously to achieve final chemistries of the most demanding grades.

Fumes from the melting furnace, canopy and ladle furnace stations are directed to a single pulse-jet baghouse consisting of 28 compartments, each with 364 bags. The baghouse is capable of a total flow of 2,300,000 Am³/h using three 2,200 kW induced-draft fans.

The infrastructure for a second EAF is currently in place for a potential Phase 2 expansion.

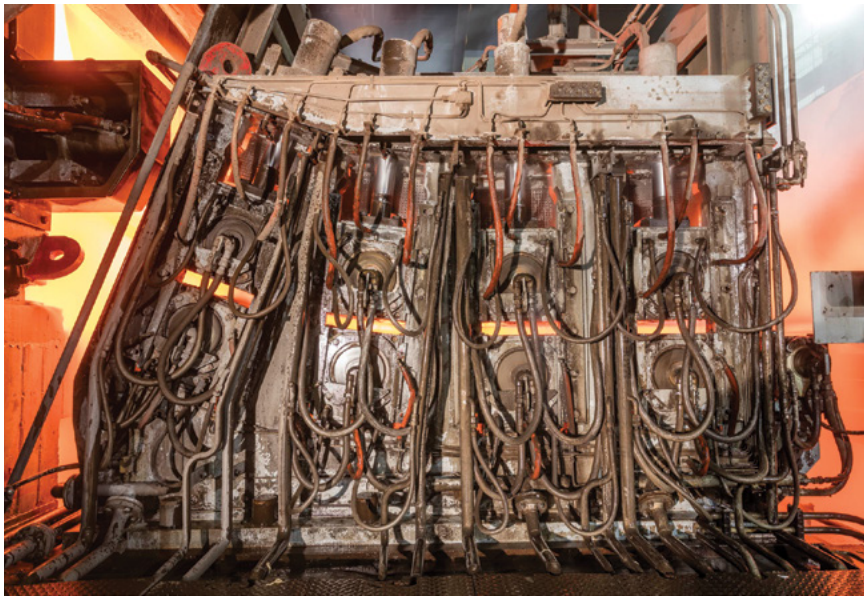
TABLE 2: MELTSHOP TECHNICAL DETAILS

EAF heat weight	Nominal 150 metric ton (165 ton)
EAF type	DC, EBT with patented pin-type air-cooled anode
EAF power	160 MW continuous
LF type	Twin-station with common electrodes
LF power system	25/28 MVA

RH DEGASSER

The meltshop boasts the only RH degasser connected to an EAF in a slab mill in North America. The RH degasser allows Big River to enhance its product offerings by lowering hydrogen and nitrogen levels and removing carbon faster, more efficiently, and to the lowest levels possible. This, in turn, enables the production of electrical and advanced high-strength steels. The degasser is under construction to be operational the second half of 2017 — in fact, it was being commissioned at presstime.

Two ladle transfer cars are used to transfer heats from the ladle furnace aisle to the treatment position. The RH degasser is a fast-vessel-exchange type with two vessel standby positions flanking the treatment position, where the vacuum pump is connected to the vacuum vessel. Once the first ladle is ready to be picked up by crane to head to the CSP casting machine, the second ladle car transfers the second ladle to the treatment position. By using two ladle cars, the cycle time of the RH degasser can be reduced.



Vacuum for the RH is provided by a four-stage steam ejector vacuum pump system. A multi-function lance is used to blow oxygen for forced decarburization, chemical heating and deskulling. The lance is also fitted with an oxy-fuel burner for vessel heating as well as a video camera for observation of the process.

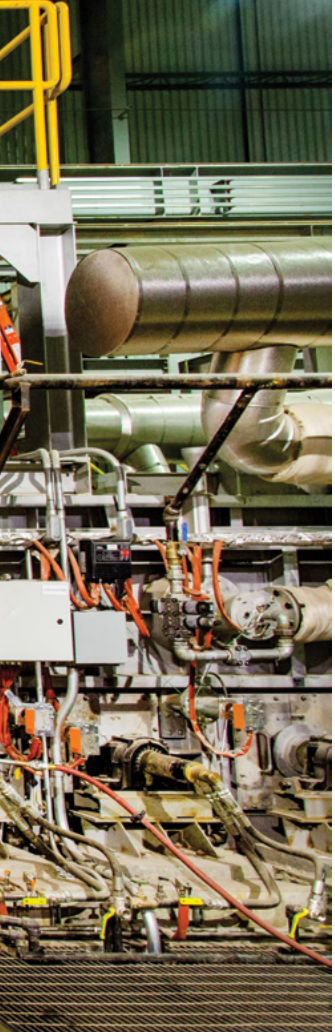


TABLE 3: CASTER, TUNNEL FURNACE AND HOT STRIP MILL TECHNICAL DETAILS		
Caster		
Ladle capacity	150 metric tons	165 tons
Tundish capacity	38 metric tons	42 tons
Slab thickness	55–85 mm via LCR plus	2.17–3.35 inches
Slab width	900–1,980 mm	36–78 inches
Furnace		
Max. furnace temperature	1,250°C	2,280°F
Slab exit temperature	1,050–1,220°C	1,920–2,225°F
Furnace length	291 m	955 feet
Rollers	Water cooled with energy-saving fiber insulation	—
No. of burners	232 extra-low NOx	—
Hot Strip Mill		
Strip width	900–1,980 mm	36–78 inches
Strip thickness	1.55–25.4 mm	0.61–1 inch
Coil weight	Max. 40.3 metric tons	44 tons
Annual production (one strand)	1,500,000 metric tons	1,650,000 tons

Plant control is carried out from a central control room via a basic automation system, which includes a process computer and a tailor-made process model. This provides heat and process-related information, collects data, tracks the physical-chemical state of the heat, and determines setpoints for the types and amounts of additions as well as the duration of time-dependent treatment steps.

CSP PLANT

The CSP plant plays a vital role in the capabilities of the Flex Mill. It consists of a thin-slab caster, a tunnel furnace, and a rolling mill with six stands and one downcoiler.

CASTER

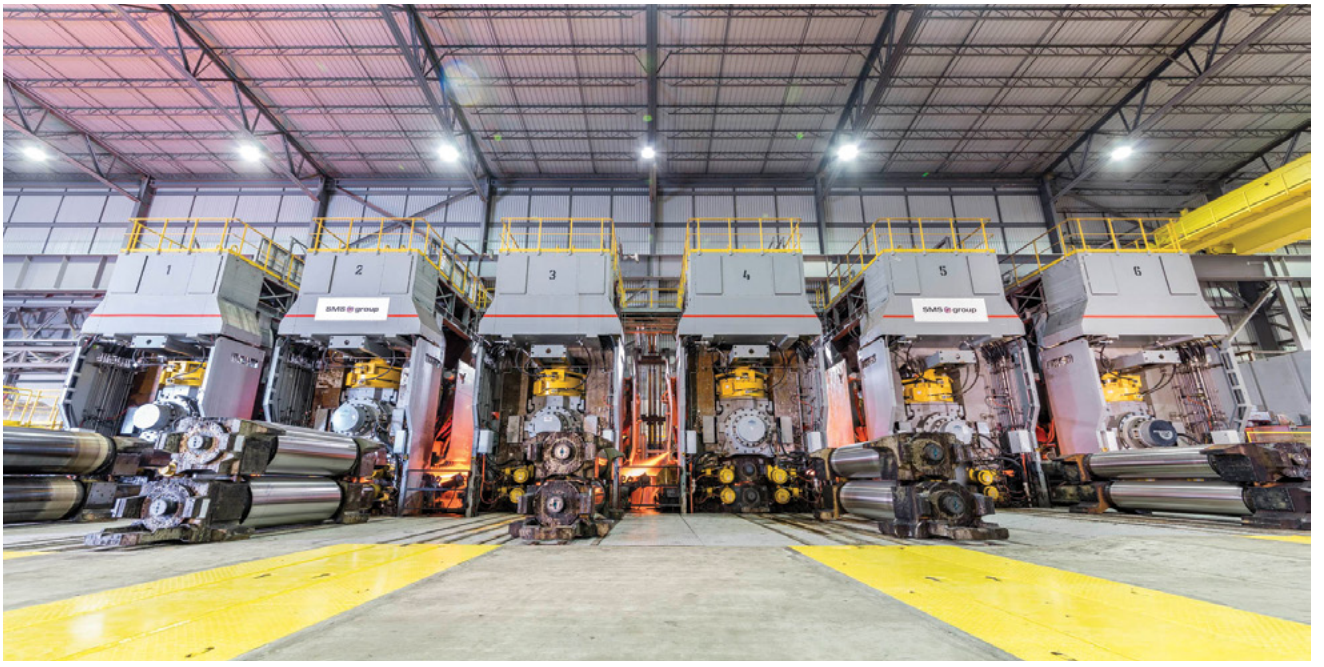
The cast slab thicknesses range from 55 to 85 mm (2.17 to 3.35 inches) and allow the mill to "flex" between heavy and light gauges, as well as meet reduction ratios required in producing demanding steel grades. For narrow molds, the caster can produce slabs 900 to 1,650 mm (36 to 65 inches), and for wide molds, it casts slabs from 1,220 to 1,980 mm (48 to 78 inches) — making it the widest thin-slab caster in the world.

The CSP casting plant features a mold monitoring system that uses thermocouples to transparently map the casting conditions in the mold, preventing breakouts. Another feature is liquid core reduction (LCR), which adjusts the slab thickness for an optimized throughput rate. The dynamic solidification control model ensures optimized cooling. Together with the soft reduction, better slab quality is ensured.

An electromagnetic braking (EMBr) system reduces the standing wave formed in the mold from the flow of steel out of the submerged-entry nozzle (SEN). The flat meniscus helps prevent mold powder entrapment and reduces mold powder consumption.

The caster pendulum shear, which has a nominal shearing force of max. 12,500 kN (1,400 ton-force), is the strongest pendulum shear ever built for a CSP plant. In addition, a unique 240 bar (3,500 psi) descaler is installed between the caster straightener and the pendulum shear.

A second caster is planned for a potential Phase 2 expansion, which will bring the mill's production capacity to over 3 million metric tons per year.



TUNNEL FURNACE

A 19-zone roller hearth furnace — the longest and most powerful tunnel furnace in North America — links the caster to the rolling mill. The first furnace zone sets the required temperature using ultralow-NOx burners. Combustion air is pre-heated with waste heat from the furnace, which is recovered by recuperators. The downstream homogenizing zone maintains the temperature and equalizes it across the length and cross-section of the slab, ensuring even temperature distribution. This particular tunnel furnace was designed for slab temperatures of more than 1,200°C (2,200°F) with growth in mind — particularly, growth in the range of steel grades it can produce, such as pipe grades, AHSS grades and silicon steels.

Included in the furnace are water-cooled rollers with fireproof insulation, which means less energy losses. Additionally, a newly developed process is used to minimize the contact pressure between the roller carrier rings and the slab.

A planned expansion of the tunnel furnace includes substituting the final section of the furnace with a multiple-module induction heating system. This would allow the slab temperature to be increased, allowing for higher-quality steel grades.

HOT STRIP MILL

The beginning of the strip mill includes an emergency shear followed by a 310 bar (4,500 psi)

TABLE 4: DESIGNED FURNACE PRODUCTION: GALVANIZING LINE

Product	Coating	Pot melt temp.	Production time (hours)	Max. speed	Designed Capability
CS/SS	GI	730°C (1,350°F)	1,114	150 m/m (492 feet/m)	67,677 metric tons/year (74,601 tons/year)
DS/HSLA	GI	730°C (1,350°F)	2,409	150 m/m (492 feet/m)	169,883 metric tons/year (187,264 tons/year)
Coated DP	GI	830°C (1,525°F)	2,659	150 m/m (492 feet/m)	160,155 metric tons/year (176,540 tons/year)
Uncoated DP	CR	830°C (1,525°F)	1,307	150 m/m (492 feet/m)	78,742 metric tons/year (86,798 tons/year)
Total	—	—	7,489	—	476,457 metric tons/year (525,204 tons/year)

descale box before entering the 6-stand, 4-high rolling mills. The mill stands are equipped with hydraulic gap adjustment (HGC), continuous variable crown technology with work roll shifting and integrated work roll bending coupled with the automation system to accurately control the strip gauge, shape and profile. An advanced surface inspection system provides the ability to accurately detect, track, and catalog defects or surface issues while in process. An intensive laminar strip cooling system equipped with the latest edge water removal system is arranged below and above the runout table. This system is capable of rapid and specific cooling rates to achieve the mechanical properties required in advanced high-strength steels. Water collectors on the drive side and operator side can be operated independently. The downcoiler is located below floor level at the exit end of the runout table. With its 1,000-kW mandrel drive and its ability to coil 25.4 x 1,280 mm (1 x 78 inch) product, it is the strongest downcoiler ever built for a CSP plant.

FINISHING

A unique feature of the cold rolling mill is in its building construction, which is made of more than 50% hollow structural sections (HSS). The idea here was simple: construct a building out of the construction products that would be made from the types of steel run in the plant. Although it has superior strength-to-weight benefits, the use of HSS in an industrial building of this size is unique. There were, of course, challenges that arose in using an unfamiliar product but those at Big River feel the extra effort was worth it.

The skinpass mill and batch annealing furnaces came on-line

BUILDING ON JOHN CORRENTI'S VISION

John Correnti was known as a visionary throughout the industry. His passing on 18 August 2015, while on a business trip in Chicago, shocked the steel fraternity at large. He was 68.

Correnti led several American steel companies and built steel mills from scratch, embracing new technologies and developing methods that greatly reduced construction times. He was the founder and chief executive officer (CEO) of Big River Steel.

He was born on 1 April 1947 in Mount Morris, N.Y., USA. The first in his family to go to college, Correnti earned a bachelor's degree in civil engineering from Thomas S. Clarkson College of Technology. He joined the steel industry in 1969, when he accepted a job at United States Steel Corporation. He held various construction management roles there and left in 1980 for a position with Nucor Corp.

Correnti joined Nucor as manager of construction and was appointed by Kenneth Iverson to CEO in 1996. At Nucor, he developed methods to fast-track the construction of new steel plants and to shorten project time by as much as 50%. He sought to decentralize power, by creating numerous layers of managers who were assigned to facilities across the country.

"All who knew John knew of his love for the steel industry and his passion for those who worked in it. He believed that the secret to making steel was simple; buy the best technology, hire hard-working men and women, and compensate them based on productivity."

— Big River Steel

He resigned from Nucor in 1999. Within months, though, Correnti was back in the industry. He emerged as the CEO of Birmingham Steel. Correnti restructured the company and sold it to Nucor in 2003. He then founded SeverCorr in 2005, which became Severstal Columbus, in 2007.

Correnti secured millions of dollars in public financing for Big River Steel, a US$1.3 billion facility, with the prospect of creating hundreds of jobs. He called the site "Steel Mill Heaven" because of its proximity to the Mississippi River, direct connection to a railroad and access to interstate highways.

"Big River Steel will be one of many legacies John leaves with us all. John was a visionary, an innovator and a leader who dedicated his career to improving the steel industry and creating opportunities for those that worked within it," the company said at the time of his passing.

Those at Big River Steel said Correnti was the driving force behind numerous greenfield steel mill projects.

"John's efforts led to the creation of thousands of high-paying jobs, an accomplishment that gave him great pride," the company said. "John was recognized as an early adapter of new steelmaking technologies. Over the course of his career, John worked with a number of leading technology companies … to continually improve the efficiency of steelmaking."

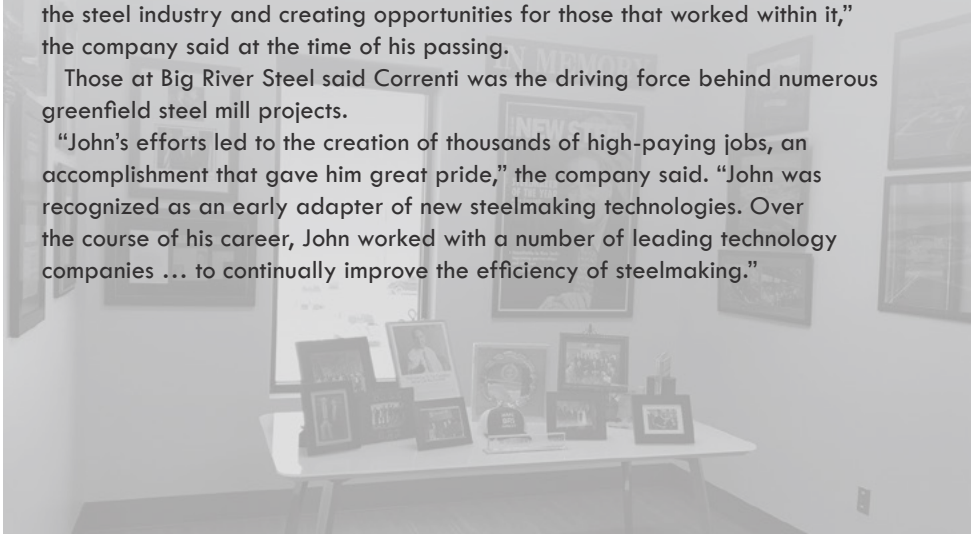


TABLE 5: PROCESS TEMPERATURES

Product	Coating	DFF temp.	RTH temp.	Slow-cooling exit temp.	UFC exit temp.
CS/SS	GI	650°C (1,202°F)	730°C (1,346°F)	670°C (1,238°F)	460°C (860°F)
DS/HSLA	GI	700°C (1,292°F)	780°C (1,436°F)	670°C (1,238°F)	460°C (860°F)
Coated DP	GI	750°C (1,382°F)	830°C (1,526°F)	800°C (1,472°F)	460°C (860°F)
Uncoated DP	CA	750°C (1,382°F)	830°C (1,526°F)	630°C (1,166°F)	150°C (302°F)

TABLE 6: PICKLING LINE/TANDEM COLD MILL TECHNICAL DETAILS

Strip width	914–1,880 mm	36–74 inches
Strip thickness **Pickled and oiled hot strip** **Cold-rolled strip**	 1.4–5.0 mm 0.27–1.4 mm	 0.055–0.200 inch 0.010–0.055 inch
Entry speed	450 m/minute	1,476 feet/minute
Process speed	200 m/minute	656 feet/minute
Sidetrimmer section speed	200 m/minute	656 feet/minute
Exit and coupling section speed	230 m/minute	755 feet/minute
TCM exit speed	1,250 m/minute	4,100 feet/minute
Annual production	900,000 metric tons	992,080 tons

in March 2016. The pickling line produced its first pickled and oiled strip in March 2017, and 10 days later the first coil came off the line in the PL-TCM. The galvanizing line began production in May 2017, during which the second coil was prime quality product.

PICKLING LINE/ TANDEM COLD MILL

Big River's pickling tandem mill features an X-Pro® laser welder for precise and rapid welding, a scalebreaker, a turbulence pickling section comprised of 27-m independent tanks, and a tandem mill with five 4-high stands. Also included is a DUMA-BANDZINK oiling machine.

The high-performance line handles high-carbon or high-silicon grades with low energy and low acid consumption, resulting in low maintenance and operating costs.

The tandem mill can process a wide range of materials. Employed here is the X-Shape flatness measuring roller, which has a closed roller surface, precision flatness measuring and optical, wear-free signal transmission. Top strip flatness and thickness tolerances are kept in check by CVC® plus technology, work roll bending, dynamic hydraulic adjusting systems and multi-zone cooling in the final stand.

Two tension coilers are located in the exit area for the continuous coiling of the rolled strip. Rotary Inspect, the latest in-line strip inspection line, is used to evaluate the strip surface quality.

TABLE 7: SKINPASS MILL TECHNICAL DETAILS

Mill type	4-high mill stand	—
Max. roll force	18 MN	2,023 tons
Elongation	Up to 8.5%	—
Backup roll diameter	Max. 1,250 mm, min. 1,150 mm	Max. 49.2 inches, min. 45.3 inches
Work roll diameter	Max. 650/600 mm, min. 450/400 mm	Max. 25.6/23.6 inches, min. 17.7/15.7 inches
Strip width	Max. 1,880 mm, min. 914 mm	Max. 74 inches, min. 36 inches
Strip thickness	Max. 1.4 mm, min. 0.28 mm	Max 0.055 inch, min. 0.011 inch
Rolling speed	Max. 1,000 m/minute	3,280 feet/minute
Annual capacity	400,000 metric tons	440,925 tons

SKINPASS MILL

Big River's single-stand 4-high skinpass mill was designed for a capacity of more than 400,000 metric tons per year (440,925 tons/year). It is located behind the batch annealing furnace and it provides the annealed carbon and a portion of non-grain-oriented silicon strips with the material properties required for downstream processing.

The skinpass mill harmonizes the yield points and sets the strip roughness and flatness. Hydraulic gap control and a strip blowoff system ensure strip quality. The mill can be operated with two different work roll diameter ranges, depending on the material requirements. Using different diameters in combination with a given roll force ensures operators can extend their product range. This means the

Coils are treated in a 100% hydrogen atmosphere and the system uses low-NOx technology in accordance with U.S. environmental standards.

UNIVERSAL ANNEALING AND GALVANIZING LINE

The universal annealing and galvanizing line at Big River includes the unique ability for dual process, allowing for the easy conversion from hot-dip galvanizing to continuous annealing. The zinc pot can be lowered into a parking position via a hydraulic platform. With the installation of a cold guide roll, this means Big River Steel can use the line as a pure annealing line. The annealing furnace is designed to produce more than 475,000 metric tons (523,600 tons) per year of cold-rolled products for the production of IF/CS/SS, DS/HSLA and DP steels for construction and automotive applications.

skinpass mill can be adjusted to meet different material requirements.

The skinpass mill's high roll force, 18 MN (2,023 tons), allows for degrees of skinpassing of up to 8.5%, the force required for silicon steel grades. The mill operates with a wet skinpassing system, and bridle rolls are installed in the entry and exit sections to ensure strip tensions.

BATCH ANNEALING FURNACES

Batch annealing furnaces anneal and cool the cold strip coils in batches, allowing for several coils to be processed simultaneously. Each of the 24 furnaces is able to handle a maximum total stack weight of 10 metric tons (11 tons), a maximum stacking height of 6.4 m (21 feet) and a maximum coil diameter of 2,000 mm (78.7 inches).

The continuous annealing and hot-dip galvanizing line is equipped with a cleaning section, an eco-friendly Drever furnace, a FOEN air knife system, a skinpass mill, a tension leveler and a roll coater.

The furnace arrangement includes a bottom-entry vertical pre-heat section, a double-top turnroll section and a 6-zone direct-fired furnace (DFF) section. The coil passes out of the DFF and is directed in a horizontal passline by the bottom turnroll. As the coil is transported through a restricted throat, it enters the 4-zone radiant tube heating furnace, where it is heated to annealing temperature. The coil is held at temperature in the 7-zone, electrically heated soak section and then directed in an upward passline by a deflector roll into the ultrafast cooling section.

The galvanizing line can accommodate a wider range of thicknesses and widths for the cold-rolled and hot-rolled products. The ultrafast cooling system allows the plant to produce high-strength automotive grades.

TABLE 8: UNIVERSAL ANNEALING AND GALVANIZING LINE TECHNICAL DETAILS

Strip width	900–1,855 mm	35.5–73 inches
Strip thickness	0.3–2.4 mm	0.012–0.095 inch
Entry speed	220 m/minute	722 feet/minute
Process speed	150 m/minute	492 feet/minute
Exit speed	220 m/minute	722 feet/minute
Annual production	476,457 metric tons	525,204 tons

AUTOMATION AND ELECTRICS

X-Pact® electrics and automation, supplied by SMS, are used throughout the facilities at Big River. Included is a flexible production planning system, technological process models,

dynamic technological controls and sequence controls, integrated operation and visualization systems, measuring devices and sensors, power distribution, and main and auxiliary drives. This homogeneous automation system allows for shorter training periods for operators, and the same or fewer spare parts.

BUILDING THE LEARNING MILL

Big River has contracted with Noodle.ai, a Silicon Valley startup, to incorporate its supercomputer-powered machine learning technology into the mill's day-to-day operations. Areas such as maintenance planning, production line scheduling, logistics operations and environmental protection will benefit from predictive artificial intelligence (AI).

The constant gathering of input and output data by this new technology will make Big River the first "learning mill" in the world. Noodle.ai's BEAST supercomputing platform will be used to help optimize a variety of functions throughout the mill, allowing downstream processes to react automatically to production challenges.

THE RIGHT PEOPLE FOR THE JOB

Those in management at Big River credit the plant's highly skilled staff for setting the pace to stay ahead of schedule in terms of production. But while Big River touts the expertise of its operators, it of course has its share of green employees. The company spent US$10 million on training, according to its chief executive David Stickler.

For training the caster operators, a full-size model of the SEN and casting process was built on-site. Since much of the casting process is contained within the mold, which is itself hidden from view, the water model provided a visual representation of what is happening inside the mold. Since water has the same viscosity as liquid steel, the model helped the employees learn about how steel would flow with particular SEN designs, widths and thicknesses.

In terms of management, an operating committee comprised of 10 members runs the show. Stickler and Bula work closely on this committee with the chief financial officer; the chief compliance officer; Bell; the quality manager; and four major department heads, representing melting, casting, hot rolling and finishing.

ENVIRONMENTAL

From the conception of the mill, there was a commitment to smart business and sustainable practices that focused on energy efficiency. In fact, Big River's goal is to become "the most energy-efficient steel producer," according to Stickler.

This commitment led to Big River Steel becoming the first steel mill in the U.S. to be LEED (Leadership in Energy and Environmental Design) certified, which it received in March 2017.

The mill and the warehouse are LEED certified at the base certification level, and its employee services building is LEED Gold certified, with its administration building under review for LEED Gold certification.

The LEED certification was completed during the mill's design process. This consisted of a review with the Green Building Certification Institute. Because of the simpler design of the administration building, employee services building and the warehouse, each of those buildings required just one review for certification. The mill itself had a more intensive review, which focused on the actual steelmaking process, and required extra scrutiny and documentation.

Because of the SMS group's heavy involvement, Big River was required to meet not only U.S. but European environmental standards. As a result, Big River Steel has the tightest emission controls in North America.

Sustainability is the name of the game at Big River. The mill produces 65% less CO_2 than a typical integrated mill. Because it uses HBI as feedstock, Big River's CO_2 output is 40% less than DRI-fed mini-mills. Through its electricity supplier, Entergy Arkansas, it produces 50% less CO_2/kWh than the U.S. average because of its mix of resources, 63% of which comes from nuclear power.

Other key environmentally friendly aspects of the mill include:

- Big River uses 30% less water compared to other CSP technology. Stormwater is captured and treated on-site. After recovery, water is used in the manufacturing process, treated and sent in to the Mississippi River.
- More than 23 acres of wetlands were mitigated or added to the mill site, and over 5 acres of trees were planted in the area.
- Big River has energy savings of 18% compared to similar plants.

While many mills find themselves retrofitting existing mill layouts and equipment with more efficient, environmentally friendly and automated technologies, Big River was fortunate to be able to install advanced technologies from day one. According to Stickler, "The world doesn't need a steel mill, the world needs a steel mill that's going to push the boundaries of what steel can do." ✦