

Big River Steel's learning steel mill to take steel production to the next level

Big River Steel is a new US\$1.3 billion flat steel complex in Osceola, Arkansas/USA, referenced in the market as Flex Mill™. This mill combines the most advanced steelmaking technologies and is designed to offer steel users access to promising niche steel products. MPT talked with BRS chief commercial officer Mark Bula and project manager Axel Sprenger from SMS group about the market prospects and the structure of this next generation steel mill with plant equipment supplied by SMS group.



Mark Bula, chief commercial officer at Big River Steel

► **MPT: Big River Steel was established in a decade witnessing overcapacities in the global steel industry. Why did you build a mill like this at this time?**

Mark Bula: When you take a look at the global steel industry or even the

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North American steel industry, it may appear as if the market was oversupplied. You would see that there's plenty of steel in the world. That holds true for the basic commodities of steel. But it is not true for the niche steels like advanced high-strength steels for automotive use and high-strength low-alloyed (HSLA) grades for applications typically using mild carbon grades. So at the beginning Big River Steel started with the question, where are the market opportunities from a standpoint of undersupply by US or North American steel suppliers. Our considerations were predominantly focused on what are the steel products that go into these markets.

► **MPT: BRS has chosen a minimill configuration to produce extra wide coils to be offered in three options, hot rolled, cold rolled or galvanized. Which markets are you targeting with these products?**

Mark Bula: We are targeting applications in the automotive industry and also household appliances. That needs to be explained in more detail. Our primary markets are also warehousing, steel distribution and service centers, pipe and tubing industry – which are actually two different segments. Then there is the transportation sector that is structured in passenger vehicles, trucks, trailers and semis. The transportation sector is a little larger than the passenger vehicle market. After that, you can look at the construction products and finally all the other miscellaneous categories, like containers etc.

Those are the markets in the United States that we target. In each of these markets there is an option to use niche steels as substitute for basic steel grades, and here we are going to build some business. First, we produce wider coils than other mills with a comparable range of grades. Second, we have the capability to produce strip with bigger cross sections than other minimills – up to 1" thick by 76" wide strip. Third, we can make these products at competitive cost thanks to our advanced thin slab technology incorporating the high-quality liquid steel refining capacities. Our mill is configured for the manufacture of a range of added value products that previously has been dominated by the integrated iron and steel works operating the BF – BOF route.

› **MPT: What are the benefits for your customers having BRS as a preferred supplier for such steel coils?**

Mark Bula: Until now the “heavier”, wider steel – strip thicker than 0.625” and wider than 72” – has been considered a premium product. Big River Steel has now the capability to produce such products using a state-of-the-art thin slab mill with all its advantages in terms of operational expenditure and product quality. On the one hand, it’s our competitive edge. On the other hand, the market demand increases for what has been called niche steels for the time being: advanced high-strength steels for automotive use and HSLA grades substituting mild steels in certain applications. Big River Steel is now able to produce such steels with the higher strip thickness and wider coil dimension according to the new market demand. For example, the market for API products is developing from X52 towards X65, X70 and X80 grades in coils wider than 72” and strip gage of 0.75” or more. Big River Steel has the capability to manufacture all these products and thus has become a much more attractive supplier for the industry. It’s the same story for the entire range of niche steel products that I mentioned before. Again, the focus is not only on the range of steel grades itself; we have to remember the dimensional differences of what has been available before now. Then it becomes clear where we compete and where we do not.

Summarizing, Big River Steel is not intending to go into the commodities business. We are targeting markets for products that are underserved in the United States by domestic production. We are focusing on niche steels that have a good potential to grow in terms of volumes for the years to come. We are convinced that advanced high-strength steels will be used in a broader range of applications as soon as they will be available in higher dimensions and at a competitive price. Applications for advanced high-strength steel are not limited to passenger vehicles. These grades can also be used for structural tubing, for decking, for building bridges and much more. There are so many fields of application the industries have started to think about. If we can make the steels stronger and lighter, it will improve a lot of products.



“We are focusing on niche steels that have a good potential to grow in terms of volumes for the years to come.”

› **MPT: Why are you so sure the market trend will go in this direction?**

Mark Bula: It is important to understand that the North American steel industry continues to evolve. If we did not compete globally with the capability built in our technology and products, we would lag behind. That I can’t accept. There are enough steel mills producing steel grades the industries use today, even DP 600 etc. Now, Big River Steel has the capability to take steel production to the next level, with DP 1000 and DP 1200 as we evolve our process and continue to expand our abilities. We are ready for the next generation of steelmaking.

metallurgical quality versus other EAF mills. Our capability in the tunnel furnace and the roll-out table gives us another advantage.

Nevertheless, we continue pushing to innovate. The technology we bought from SMS group is the best available for making flat steel products. With this technology we are in a position to evolve our process chain and also our products. We want to go faster, but we have to accept there is a learning curve and we are taking the course now. We are still in the start-up phase of our production. There are so many products that we start with. We are still developing our original products, for instance martensitic

“LEED certification and artificial intelligence differentiate us. That’s exciting!”

› **MPT: For the first time, a North American CSP thin slab plant is processing liquid steel refined by an RH degasser. Why did you go for this combination?**

Mark Bula: The EAF meltshop provides the liquid steel, but downstream we have a unique combination of technologies that gives us an edge. Using the RH degasser, we produce higher

grades. Some of them are hot bands, others are cold rolled or even galvanized ones.

› **MPT: Do you also intend to produce silicon steels?**

Mark Bula: This mill has been built with the ambition to eventually make silicon steels. We could already make

“We are trying to do things differently from the way we have done in the past.”

the substrate today. However, it will still require a significant investment to start commercial production. Our plans are as follows: If we entered the market for silicon steel, we would have to be able to make advanced products also in these categories. We are actually interested in making extremely light gage, non-grain oriented (NGO) electrical steels that are used for the drives of electrical vehicles. These high grades represent another niche in the market where we don't see oversupply. Also, we have figured out a similar scenario for some high-value grain oriented (GO) silicon steels, where production capacities in the US are actually limited today. We are very thoughtful. For the next phase of investments these products will be in the focus.

› **MPT: So the main products of Big River Steel will be the advanced high-strength steels and the silicon steels?**

Mark Bula: Both products are of utmost importance for the next generation of light-weight electric passenger vehicles. Becoming a supplier of both – the advanced high-strength steels for the car body and the non-grain oriented silicon

Mark Bula: The “smart” steel mill will allow us to make better business decisions faster, more accurately and with better business results than we've been able to make in the past. With artificial intelligence come to be, we don't need to actually make the decisions; the system will make the decisions for us. The decisions will be artificially determined as the process unfolds. The system will always monitor itself and will adjust the process parameters and schedule accordingly.

It's similarly in sales where the system will enable us to take the right orders, and the system will schedule the steelmaking and rolling processes based on all the information about resources on hand, plant availability and all the hundreds and thousands of factors. That's an enormous speed increase in better decision making. I think we are on the cutting edge and the new AI together with the smart mill from SMS group helps us to get to that next level.

When saying we'll be able to get better business results, it doesn't mean for ourselves only, but for our customers. How do we supply steel faster, more ac-



plant automation system. I don't know if we are probably the only steel mill in North America that is working with an AI company within our organization and implementing artificial intelligence, but we are definitely at the forefront of this.

There are more data points being attained in the automation systems of our mill than has been done in the past. We achieved an important advantage as electric and automation supplies for all plants – Level 1, Level 2, Level 3 – were provided from one source: SMS group. That helps to collect all the necessary information in a proper way. We wanted only one single provider for all the electric and automation systems to overcome the problems with interfaces, when systems from different providers do not communicate to each other properly.

› **MPT: Your steel mill has been awarded with the LEED certification – Leadership in Energy and Environmental Design. Why is this so important to you?**

Mark Bula: We had SMS group design this minimill to meet the highest standards in environmental controls. Knowing that, we immediately went after the LEED certification. Steel users and end users are looking more and more after this certification. Since LEED certification is best known for building design, our customers in the construction industry are very LEED sensitive, and so are the automotive companies. They all want their supply chain to be LEED certified, too. So the LEED certification helps us to

“We reach for the next level of responsibility and sensitivity to make things better for our community – for our customers and our employees.”

steels for the electric drives – gives us an edge. We will be able to offer the entire package. That's a very interesting supply chain for the automotive industry and a very interesting opportunity for us.

› **MPT: Your company has partnered with Noodle.ai to create a “learning steel mill” powered by artificial intelligence. What does this mean in concrete terms?**

curately on time, in tighter tolerances. So our customers can also improve from that.

› **MPT: Does this imply additional efforts to integrate AI into the new plant equipment?**

Mark Bula: The AI experts from Noodle.ai will help connect our business information system with the

market our products. The entire steel mill and even our office buildings are designed to be energy efficient and environmentally sustainable with a view to receiving LEED certification. If it's important for our customers to have a product that is energy efficient and environmentally friendly, we can show them that we have the same importance, the same thinking, the same focus on that. We want to be at the forefront also in terms of sustainability. People realize how we act as a company and that we are environmentally cautious.

› **MPT: Big River Steel was built and started up in a fairly short time. How did you manage the project to become reality so fast?**

Mark Bula: There are simple reasons: a balanced approach and excellent teamwork. Our teamwork involves SMS group – our equipment supplier – finance, operations, quality management, sales, shipping, and last but not least our customers. We are happy to have customers who want to team with us – to give us orders that help us to get started. It has been important for us to have the right orders in the first month to get our production started and, after that, are continuously revolving. Teamwork is building credibility and integrity in the way we do business with our partners, with our customers and also internally. People out there and also within our company will take note of that.

Big River Steel has a management team and labor group who gained a lot of expertise from previous projects. With such wealth of knowledge and experience it is easy to build a good teamwork very quickly. Any mistakes from the past can be avoided. A great example is: having one company, SMS group, being the entire provider of electrical and automation systems eliminates any finger pointing between different parties. It's those types of mistakes that happen in the past. And you say to yourself, we're not going to make that mistake again.

Axel Sprenger: Communication has been a key factor for the success



Mark Bula (left), chief commercial officer at Big River Steel, and Axel Sprenger, project manager at SMS group



“There are some niche positions in the market and there is new technology that makes it more cost efficient to manufacture the products for these niches.”

of this project. Everybody has been open for cooperation at any time. Here we have found a common sense that if there is a problem or disagreement, let's put it on the table to find a solution. Here at Big River Steel we have a team with an outstanding spirit for cooperation. This has fueled the progress of the project from the very beginning. Everybody here knows about the importance of communication and mutual trust. Video conferences and other advanced techniques have been used

to save time and made perfect communication at a high level so easy.

Mark Bula: Communication is very important, because it's the speed of decision making and the speed to come to the conclusions and proceed with the project. People involved like working that way, because it is successful.

› **MPT: Thank you very much for the interview.** ■