

'Be safe, be proud, make money...'

Last year, Big River Steel in Osceola, Arkansas, USA, produced 1.65Mt of steel with just 518 employees. CEO Dave Stickler is planning to up that to 3.3Mt with only an additional 150 employees. How do you do that, Dave? By **Matthew Moggridge***



“We were almost 10 times more profitable than US Steel per employee.”

LIKE an impromptu gig by a major rock star, I was tipped the wink that something big was going down on the SMS group stand at METEC. Although, to be fair, the word 'stand' or 'booth' did little justice to the huge space occupied by the German plant builder.

METEC, for those in the dark, is a massive exposition and convention for the global metals industry combining three other events – GIFA, ThermProcess and Newcast – under the banner 'The Bright World of Metals'. It takes place every four years in Düsseldorf, Germany, alongside the European Steel Technology and Application Days (ESTAD) conference.

This year, the event clashed with what the media described as a 'Saharan heat bubble',



which was basically furnace-hot weather that lasted the duration of the event.

On reaching the SMS stand, I pushed through the crowds and spotted a familiar face. It was none other than the global steel industry's rebel with a cause, Dave Stickler, the CEO of Big River Steel in the USA and the first recipient of an SMS group 'learning mill'.

Back in October of 2017, Steel Times International travelled to Osceola, Arkansas, to meet Dave and his associates and talk about the new facility. Back then, as now, Big River Steel (BRS) was the talk of the town (and the world) in a big country where electric steelmaking rules the roost (accounting for 69% of all US steel production). Stickler is the electric warrior, the metal guru of EAF steelmaking, and the David (or Dave) to the integrated steel mills' Goliath.

BRS was designed with a clean sheet of

paper to produce steels that, prior to the company's arrival, had never been produced by a minimill. In short, BRS adopted the motto of the Starship Enterprise, 'to boldly go where no EAF steelmaker has gone before', and soon it will be producing fully processed, grain oriented steels and more.

10% over rated capacity

Two years on and Dave was in fine fettle, thanking his friends from SMS group for the opportunity to participate in what he described as 'another wonderful conference'. He was quick to correct a factual error on a short video presentation. "You put 1.5Mt as your rated capacity [for the Big River Steel plant], but with SMS' help, we're running at 1.65Mt, so 10% over rated capacity," he said.

Stickler started his career in investment banking and one of his first steel clients was US Steel. "We were putting in some

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takeover defences and that's when I first got to know the steel industry," he said. "The first minimill that I was involved with was the formation of Steel Dynamics when three individuals left Nucor Corporation to build their own steel mill. We teamed up with SMS, at the time just the furnace through the caster, worked with KFW, a great German bank that I've come to know over the last 20 years, but over that period I've had great success in putting greenfield mini-mill projects together around the world – the vast majority of them having SMS equipment."

Asked to provide an overview of the last four years of Big River Steel, Stickler recalled his first day in business. "We had five employees and 1.6 billion dollars in the bank. It took us above 27 months or so to build the facility, we build these facilities ourselves and peaked out at about 2,000 construction workers," he said, adding that he was 'very very proud', of the fact that, from a safety perspective, 'our construction

effort was absolutely outstanding'. "Our safety [accident] incident rate was one tenth of the average in the United States," he said.

Steel production at Big River Steel started in January 2017 with a large team of SMS technical and start-up specialists on-site. "In that first month we set a production record in terms of tonnes of steel produced by a new CSP facility, we were over 60,000 tonnes of steel production that first month," Stickler said.

According to Stickler, the business was EBITDA positive in its second month. "And that's highly unusual for a start-up company, I don't care what sector you're in," he said, stating that to be EBITDA positive in your second month of trading was 'hats off to the team we had'.

The mill was running at 81% of rated capacity in six months. "We had a highly well-trained workforce," said Stickler, claiming that the company was the most successful steel producer in North America

in terms of EBITDA/tonne of steel shipped after its second year of operation. And what's more, Big River Steel is the only LEED-certified steel production facility in the world.

The tie breaker

"Some of you in Europe may not know what LEED certification stands for, that's Leadership in Environmental and Energy Design, and usually that certification is for office buildings, colleges and universities, hospitals and government facilities. We were the first and only heavy industrial production facility in the world to try and become LEED-certified and now we're the only steel producer that has that," Stickler explained. "Why is that important? People certainly aren't going to pay more for our steel because it was produced in a LEED-certified facility; however, if our steel is selling for \$900/tonne delivered and one of our competitor's steel is selling for \$900 delivered, everything else being equal, I'm



I want to run every day of the week, every week of the month, every month of the year as hard as we can.

going to get the order, so it's a tie breaker.

"I'm not a gambler, but if you go to Vegas, the house always has the tie breaker, they make a lot of money, I'll take the tie breaker," Stickler told his audience."

"And I'll tell you who's really interested in this [LEED certification] is companies such as BMW and Mercedes. BMW is talking about making a television ad in north America where they take a 15- or 20-year-old BMW, take that car, show it on the television ad going to a shredder, all the plastics go one way, the metal goes to another pile and then the scrap metal is dropped into our furnace, goes all the way through our process into the galvanised coil and that coil gets shipped back to BMW – an old BMW turned into a new BMW. I would love nothing more than having to follow through on that television ad," Stickler admitted.

Stickler explained how Big River Steel is able to double its capacity. "It is a great story. This is interesting: we just did this a couple weeks ago, even though we've been operating for over two years now, we were able to approach the capital markets and raise 487 million dollars of 30-year money with 20 years interest-only, so we don't have to pay any interest back on that money for 20 years at a rate of 4.5% – very, very, very inexpensive capital – and that's allowing us to double our capacity." He explained how BRS has ordered additional equipment from SMS and is looking at another mill location in Brownsville, Texas.

Stickler is proud of Big River Steel's profitability per employee. "Last year, which was our second year of production, we produced US\$557,000 of EBITDA profit per employee. Look at our competitors – and these are good competitors – Steel Dynamics US\$253,000, Nucor US\$157,000, some of these other companies maybe not

quite so good, US\$61,000; we were almost 10 times more profitable than US Steel per employee," he said.

Big River Steel produced 1.65Mt of steel last year with 518 employees and once the new equipment is up and running, the mill will produce 3.3Mt of steel. "And I'm only going to add 150 workers, so with 668 workers we'll be producing 3.3Mt of steel, this will be over a million dollars. That's Silicon Valley-type profitability numbers per employee. People say, well Dave, how can you do that, and I say, I don't do anything other than hire good people and buy good equipment. I train the heck out of workers and then I get out of their way. And these are the results that we've had.

Stickler is proud of the fact that each Big River Steel employee produces 3,250 tonnes of steel. "I'll hold that number up against any steel producer in the world. I don't know all the numbers, there are steel companies all over the world, I visit a lot of them and I've yet to find one that can come even close to that, and again this is 1.65Mt with 518 employees; wait until we produce 3.3Mt with 660 workers, this will be terribly close to 7000/8000 tonnes per employee. We're just so productive because of the technology and the automation installed at Big River."

It's all about profitability

People often ask Stickler how he operates his business and he tells them straight: it's all about profitability per time on the mill. "Are we running and are we running full and are we running hard? I want to run every day of the week, every week of the month, every month of the year as hard as we can," he said.

He admits that some people might ask him how come he's talking about profitability per tonne shipped as if he's

the number one player in the market, when in reality he's number two. "But this is profitability per tonne shipped last year and that included our 13th, 14th and 15th month of operation, we were just getting our legs underneath us. Give me to the end of this year and I fully expect us to be the most profitable per tonnes shipped."

At present, Big River Steel is selling API grade pipe. "We were just involved in a 600-mile pipeline project that ultimately is Exxon, a big energy company, already, and this is something that has really impressed me: after just over two years of operation, we're selling direct to three automotive companies, we just passed our Mercedes audit three weeks ago, so by the end of the year, we'll be selling direct to Mercedes. It's unheard of for a company this young to be selling direct. People ask, why do you think that is, Dave? Well, 100 years ago, 30 years ago, the integrated steel community produced 100% of flat-rolled steel in the world. In the US today the integrated community produces less than 40% of flat-rolled steel, in another five years it'll probably be less than 25%, five years after that probably less than 15%, so the domestic and foreign auto guys who operate plants in the US, they know that they've got to diversify their sources of supply. If the truth be told, the minimills have been selling to the automotive community for a long time. When we did SDI, we were selling deep drawing quality steel to Chrysler fairly early in our life," he said.

The rebel of the industry

Stickler is getting a reputation for being 'the rebel of the industry' and has been filmed arriving at Big River Steel on a rebellious-looking motorcycle, I'm guessing a big Harley, at the official opening of the



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mill. But what’s it’s like partnering with the rebel? The best person to ask is SMS group’s CEO, Burkhard Dahmen.

“Being the partner of the rebel of the industry is a challenge and an opportunity,” he said. “Definitely there is a lot of pressure, but the pressure is a challenge and an opportunity. The challenge is to serve the rebel of the industry with a complete greenfield installation consisting of five different process units, which you have to pile up to combine together not only mechanical-wise, but also from the automation and digitalisation point-of-view, because Big River Steel operates the first learning steel mill in the world. We have the opportunity to develop something for the rebel of the industry who was demanding us to come forward with new developments, it’s not just delivering the state-of-the-art or something you can always have visited before at another place. No, we were requested to provide something new and this new technology is impressive for the productivity. I mean we have guaranteed 1.5Mt and they have achieved 1.65Mt. The opportunity for us was having a challenging partner and I’m saying ‘partner’ because we are in a partnership, it’s not always nice and friendly, but it’s honest and direct and that’s what’s necessary,” Dahmen said.

Stickler said that sustainability distinguishes Big River Steel and SMS group from the world’s steelmaking community.

“But the other differentiating factor is our full embrace of big data mining and machine learning. We’ve designed this mill to be the world’s first learning mill. I want to know as much about our operation as Google and Apple know about the autonomous cars that are driving around various cities in the world. Many of our competitors after 30, 60, 90 days, they discard their electronic data; we don’t throw anything away and believe me,

I didn’t count it, but the folks who are involved in our automation and big data mining told me that as of 31 March 2019, after just after two years of operation, we have looked at and analysed over a trillion data points. My goal is to know as much about Big River Steel operations as Rolls Royce and General Electric know about those engines that are flying around on Airbus and Boeing planes.

Wrong answer!

At Big River Steel they don’t have swear words, but swear phrases, one being ‘that’s the way we’ve always done it’ of which Dave Stickler is not a fan.

“So, for instance, early on I asked our maintenance team why are we going down every four hours, once a week, for maintenance, and the gentleman, highly experienced, probably one of the best at what he does, told me, Dave, that’s the way we’ve always done it. WRONG ANSWER! WRONG ANSWER! Let’s see what the data’s telling us. If we’re running grades in width and thicknesses that are hard around the mill then maybe we’d be better off going down every fifth day rather than once a week, but if I’m running thinner, lighter, softer material, maybe I can stretch that to every 10th day,” explained Stickler.

The other banned swear phrase is ‘random event’ and if uttered, it will lead to Stickler exclaiming ‘WRONG ANSWER!’

“A month or so ago, I asked a melt shop manager, what the heck happened, I come in to work and the furnace is down. What happened? He said ‘random event’, WRONG ANSWER AGAIN! We don’t believe in random events, if you look at enough data you’re going to start to see predictive patterns, alright, so believe me if you come to Big River Steel and visit, and we’ve had literally hundreds of visitors in our first two years, you’ll never hear ‘that’s the way we’ve always done it’, or it’s ‘a random

event’, they’ll give you some other answer, but hopefully not those two swear words,” he said.

Big River Steel relies upon digitalisation and Artificial Intelligence. The whole company is run in ‘the cloud’. Many people believe that such a policy leaves the business exposed.

“Nonsense, we’re much more secure, we’re much more in tune with security breaches and we save a heck of a lot of money. I don’t have to spend the tens of millions of dollars on the big server platforms and I don’t need a 35-person IT department to maintain the servers, so yes we embrace technology in everything we do,” Stickler countered.

Asked whether Big River Steel employees embrace the technology too, Stickler referred back to the mill’s LEED certification. “They said no, Dave, that’s for hospitals and universities. I said I know what it has been before, but let’s try it. Then, when I said okay, we’ve designed this mill to be the first learning mill, there were a lot of people saying ‘oh yeah, yeah, I’ve heard that’, so what I did was I took one of the individuals who you would think would be the last to embrace big data, he’s been involved in the steel industry for probably 45 years, I think he’s third generation, he’s got four or five relatives working, and I think if I can get him to embrace the use of big data mining, my job is going to be so much easier because it’ll be somebody people look up to; it took me a while, but he’s now one of our biggest digitalisation champions.”

Transparency is crucial

For Stickler and Dahmen, transparency is crucial, but for many steelmakers, protecting data is very important and is not shared with third parties. According to Dahmen, however, SMS group’s relationship with Big River Steel is totally different and refreshingly so. “They have



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opened up their pocket, they said whatever kind of data is available, take it and use and it will definitely be to the benefit of Big River Steel. So we have a green facility where we have full access at any moment or point of time to all data and that is the basic principle that leads to better quality, lower energy consumption and higher throughputs,” he said.

Stickler is proud of the results so far. “Burkhard’s correct, we try and operate with full transparency, unlike a lot of our competitor installations where visitors can’t talk to the employees, they’re not allowed to take pictures. I encourage all our guests to get out on the floor and talk to our employees. I don’t hide behind intellectual property protectionism or try to build up barriers. We operate more of the Tesla model where Tesla will put its drawings and engineering work on the Internet. My attitude is people will ultimately get there and if I can play a little part in helping the world steel industry compete successfully against aluminium and titanium manufacturers as well as other materials being developed at a relatively fast pace, I will have accomplished something,” said Stickler.

Back to the future

Asked to look ahead and imagine a future SMS group invitation to METEC 2023, what would Stickler have to say? “I would be presenting another highly successful ramp-up of our phase two expansion at Big River, which again is the second EAF through the down coiler and, most likely, although we haven’t had the order yet, an NGO [non-grain oriented steel] facility which is the electrical steels used in the high-efficiency motors of hybrid and electric vehicles,” he said.

Stickler said the plan was to produce non-grain oriented steels fully processed down to 0.10mm thickness and 1,650mm

wide. “So that’s the widest and certainly the thinnest in the world,” he said.

“People say, ‘Dave, you don’t need to go that thin for your NGO steels’ and they’re right. Today I don’t, but guess what? In two, three, four years from now I want to, so if I can produce those steels that thin it will allow the laminations that go in to the motor building process to be that much lighter and that much more efficient. So it’s likely we’ll be talking about another flat-rolled steel production facility that we’ve either just started up or about to start up in Brownsville, Texas. Somebody write that down and see how accurate I was.”

The world’s first smart mill?

When the Big River Steel project started, Stickler said he made the mistake of saying he was designing the world’s first smart mill. “But somebody much smarter than me said that’s not true and I said what do you mean? They said your vision was to continue to collect data, continue to improve and continue to mine that data. So on a spectrum between one and 10, with 10 being completely finished with big data mining and AI, we’re probably on square one or two, but we’ll be continually learning and my goal is to continue to operate safely and continue to operate highly profitably per time on the mill. I think that the tools we’re building will allow us to continue to enhance our profitability.

He highlighted Big River Steel’s low power costs, claiming that, ‘fully loaded’ it’s 34 dollars per megawatt on an 11-year contract. “First of all we use less energy than anyone who produces steel, certainly in North America. We believe our power rate is the cheapest. I have the ability – if I can determine and predict how much energy I’ll use in my furnace to melt the scrap – to sell any excess power I have. So literally every minute of the day, every hour of the day, every day of the week, not only

are we using large amounts of power, but we’re selling power back to the grid. Right now we’re operating with a 10% buffer because the last thing I want to do is tell my meltshop guy he hasn’t got enough power because I sold it. He wouldn’t be happy, so we’re operating at a 10% buffer. Next year my goal is to operate with a 5% buffer and ultimately with a 2.5% buffer. The only way I can do that is to look and become absolutely certain based on the analytical data we analysed on where we are.”

When a journalist asked Stickler how outsourcing plant maintenance was going, he said it wasn’t true. “It’s not correct to say we’ve farmed out all of our maintenance. I’d say it’s more of a co-operative arrangement, in some cases with SMS; they have a maintenance shop approximately a mile and a half down the road where they do our caster repair and our roll shop,” he said, explaining how some day-to-day repairs are handled in-house.

We did have a death

When Patrick from Nigeria asked about safety, Stickler commented, “We did have a death,” and then told the sad tale of an owl that had somehow found its way into the transformer station. “The owl was killed, right, so that was an unplanned event,” he said. “We were down for 13 hours. I don’t know how an owl got into the transformer station, but it did.” It was a random event, but I said nothing.

“When we first started up we had issues with our scales, they weren’t completely accurate, so we’d be shipping a coil of steel that was 20 tonnes to our customer, but it turned out to be 19.9 tonnes, but these are normal teething issues. Every day we focus on safety and profitability. Our company motto is very simple: be safe, be proud, make money, and so far we’ve been able to achieve those three things. ■