

## coil processing



Chicago Steel's Herr-Voss tension leveler removes residual stresses from the strip.

# Where service is king

Toll processor **Chicago Steel** has positioned itself as a one-stop shop for coil processing needs **BY GREG FARNUM**

**A**sk Dan Phillips, president of Chicago Steel in Gary, Ind., and he'll tell you his company is all about service. That's not surprising considering that Chicago Steel is a toll processor, neither buying nor selling steel but performing operations on flat-rolled coil that belongs to others. Phillips' company, however, has taken the service of toll processing to another level.

Chicago Steel, which operates out of a 317,000-square-foot facility in Gary, has a 164,000-square-foot plant in Fairless Hills, Pa., to serve the East Coast and employs 100 people, first stepped out of the industry mold back in 1990 when it installed its first Herr-Voss tension leveler at the Gary plant and, shortly thereafter, rolled out its "Five I-Unit" guarantee.

The tension leveling process with the Herr-Voss system is elegantly simple, though the machine itself is highly complex. "The coil is wrapped around the system's four entry bridles, through the leveler and then around four exit bridle rolls," explains Phillips. "The entry bridles turn a little slower than the four exit bridle rolls, putting the strip under tension. The strip is pulled over four work rolls in the leveler—much like a roller leveler. The combination of the strip under tension and the strip being wrapped over the four work rolls allows us to pull the strip beyond its yield point. Once you pull metal beyond its yield point, you are able to permanently change the shape of the product and eliminate shape issues such as edge wave, center buckles and coilset conditions."

With conventional roller levelers, by contrast, only a thin cross-section of material is changed while the grain structure of the interior of the material remains unchanged. The residual stresses within this unchanged interior can cause shape defects to reoccur during subsequent operations.

“When we did the capability studies on the new tension leveler we discovered that this state-of-the-art equipment was able to generate flatness on product that was unprecedented.” To fully measure and illustrate that exceptional flatness, Phillips chose the I-unit. Though widely used in Europe and Asia as a measurement of flatness, it was hardly known and rarely used in the United States. While the commonly used ASTM flatness standard for cold-rolled sheet focuses on maximum height deviation from a flat plane, the I-unit is a combined measure of maximum height deviation and the frequency with which that deviation occurs.

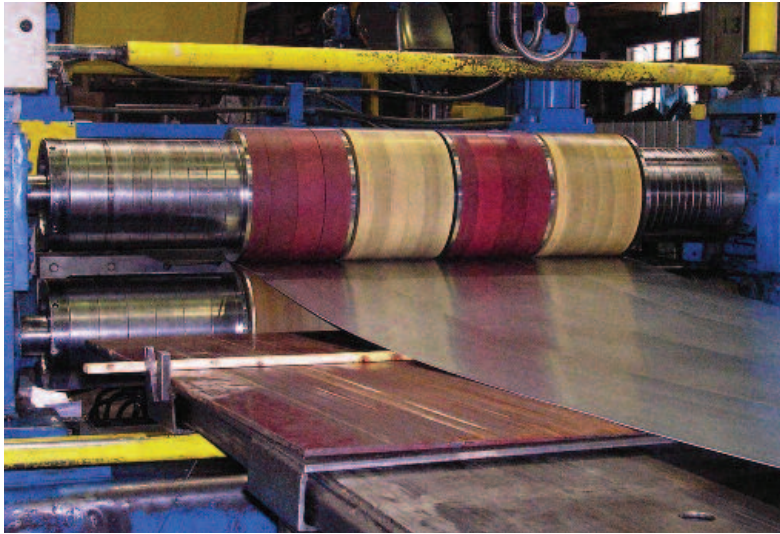
“Frequency is directly related to the acceptability of product,” says Phillips. “Let’s say a coil has a 1/8-inch standard deviation from a flat

plane. If that deviation reoccurs every 24 inches that’s very low in terms of I-units [7], but if that same 1/8-inch deviation reoccurs every 3 inches it’s 428 I-units, and that material is unusable. Therefore you have to consider reoccurrence, or frequency, to get an accurate picture of the product. That’s the beauty of the I-unit.”

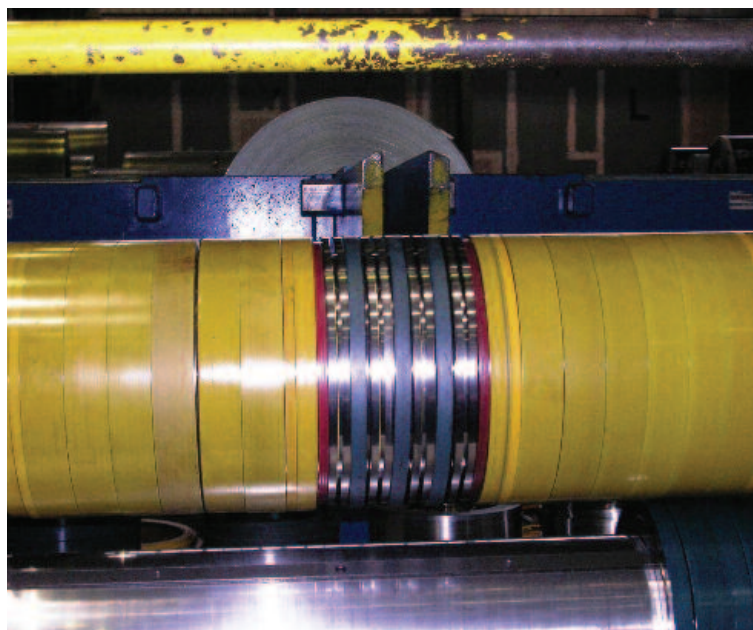
## Marketing flatness

Sensing an opportunity, Bruce Mannakee, Chicago Steel’s president at the time, launched the 5 I-Unit guarantee: Any coil tension-leveled by Chicago Steel would meet or exceed 5 I-units

flatness or the leveling would be free of charge. In fact, it wasn’t much of a gamble. “Though the Five I-Unit guarantee was more stringent than anything in the market at that time and was actually tighter than the appliance standards of the day, 97 percent of our work was less than 1 I-unit. In fact,” notes Phillips, “we were averaging 1/2 of 1 I-unit, regardless of how bad the material looked on first coming into the lot.” Those are quality



**The Gary, Ind., plant offers slitting services, which is unusual for a toll processor, helping make Chicago Steel a “one-stop shop.”**





**Bridle rolls at the front and back of the Herr-Voss machine turn at slightly different speeds, creating the required tension.**

marks that Chicago Steel has consistently maintained through the years.

Today the company has two Herr-Voss tension levelers and Phillips reports that selling customers on the value of tension leveling and the use of I-units is not as difficult as it used to be. “The major mills are very much into this; they recognize its benefits. This goes along with the fact that they have made great strides in upgrading their equipment and implementing advanced technologies in the rolling area, including automated measurement systems, and they are, in general, producing a much better product than they were 15 years ago.” As a result, he says, the amount of shape correction needed on their material tends to be much less than in the past.

He notes that some mills have now integrated tension leveling into their lines. “The biggest difference between the integration of tension leveling into the rolling mills and the freestanding tension leveler, as in our case, is that we can start and stop at any time. We can run as slow as 100 feet per minute if need be and make adjustments on individual coils to ensure we obtain the precise shape required. This is not the sort of thing that the major rolling mills, [who are] under intense pressure to keep productivity high in order to compete in the global market, can typically afford to do.”

Many of the major end users also recognize the value of tension leveling and I-unit measurement. “They understand how detrimental inconsistent product can be to them. However, there are

still a very large number of companies out there that really don’t understand it yet, they don’t understand the impact that using inconsistent product can have on their operations and their profit.”

That impact, he says, includes more scrap, more rejections, and decreased productivity because of slower line speeds. They also lose out on what he sees as another major benefit: the ability to accurately quantify the precise degree of flatness needed for a particular application. “If you find you need 5 I-units of flatness then you can order to that specification, and if you find that your flatness requirements are less stringent, say 10 I-units, then that’s what you specify. You no longer have to order more or less flatness than you actually need.”

#### **Selling service**

Given his enthusiasm for the tension leveling and I-unit approach that Chicago Steel pioneered, it comes as something of a surprise to hear Phillips say, “We’re not just about tension leveling anymore. The industry knew us as the benchmark for shape correction but we have expanded our processes in many different directions. Today we are about providing multiple services under one roof on a toll processing basis.”

Among the services provided are cleaning, oiling (a Peabody electrostatic spray oiler re-oils the coil as it exits the tension leveler) and, at the Gary plant, side trimming as the coil enters the tension leveler. It can trim within a thickness range of 0.015 inches through 0.080 inches and remove from  $\frac{3}{8}$  inch through

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**Each tension-leveled coil is visually inspected and gauged at the inspection station.**

2½ inches per side.

Of course inspection services are provided, including a strobe light-assisted inspection to help in identifying minute defects for critical applications such as exposed automotive.

Chicago Steel also provides temperature and humidity-controlled warehouse space for customers. The warehouse at the Gary plant can handle coils up to 40 tons while Fairless Hills can handle 30-ton coils in storage, and both have rail sidings.

This year, slitting lines have been installed at the Gary plant. “We now have a 72-inch Pro-Eco slitter with a Herr-Voss strand extension on it, which allows us to pull through good tight cuts with minimum camber and great shape characteristics,” says Phillips. “This slitter handles thicknesses ranging from 0.017 inch through 0.175 inch. We also have a 60-inch Paxson slitter with an additional 72-inch head and a 24-inch Yoder slitter. Though this is a new capability for us it has been very well received and we are slitting at a level of approximately 6,000 tons a month.

“We’ve become essentially a one-stop shop for servicing our customers’ toll processing needs,” Phillips continues, “and I don’t know that there are many one-stop-shop toll processors out there. If you look at who provides multiple services for our industry at one location, generally it’s a service center. The difference though is that service centers run material that they’ve purchased and then turn around and resell it. The problem for them occurs when they have order books that exceed the capability of their line. Then what do they do? They don’t want to give it to their competitor. That’s where we can step in and help them out.”

Phillips characterizes the advantage of his company’s one-stop-shop approach to toll processing as two-fold. “First, when our customers’ material comes into our shop they can have it processed in a number of different ways and they don’t have to move it. They can just keep it here and have it go from one process to another and not pay a penny in freight. This has been very well received by our

customer base because ultimately it means larger profit margins for the service centers and mills simply through the elimination of freight charges.”

The other advantage he sees is in speed. “One of the big issues in our business today is turnaround time. Mills and service centers feel pressure to respond to their customers faster, and we help them do that by taking away the time it formerly took to ship coil from one operation to another,” he notes. “Another way we do that is by monitoring our internal operations to make sure that we are processing their coil as rapidly as possible.”

Sometimes that’s pretty rapid indeed. “On occasion we will receive coils in the morning, enter those coils into our system and generate all our internal paperwork on those coils, process them, then ship those coils by the end of the day. Now I don’t want to mislead and imply that this sort of situation happens all the time—if it did that would be a major headache—but it does happen, and it’s part of the service that we are ready to provide to our customers because, essentially, our business is built on service.”

As for what the future holds, Phillips predicts rising demand for Chicago Steel’s slitting capability, as well as increased need for toll processing services on the higher-yield material that is becoming more widely used in the automotive industry. And what new service capability will Chicago Steel add? “That depends on what the market dictates. Whatever the market needs we will try to address on a toll processing basis,” says Phillips. ■

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