

# Rolling Along

BY GEOFF WEISENBERGER

An inside look at how large coils of flat steel become uniform pieces of metal deck.

**THE CMC JOIST AND DECK FACILITY IN PERU, ILL. IS HARD TO MISS.** Just north of I-80 about 100 miles west of Chicago, the mammoth blue metal building clearly stands out from the surrounding flat landscape.

The facility, which opened in 2000, was formerly part of Nicholas J. Bouras, Inc. before that company was purchased by CMC Joist and Deck in April. It makes metal deck exclusively, producing approximately 300 tons of deck per day to be used as composite and form decking (both with concrete), as well as roofing. It is one of three CMC Deck facilities; the other two are in New Jersey and South Carolina.

Speaking of which, the main benefits of steel deck are its high strength-to-weight ratio and load-carrying capability, which it gets from its corrugated profile. In flooring applications, these attributes supplement

and reinforce the concrete, which is placed over the metal deck. Composite flooring systems allow for longer spans and thinner floor slabs than do non-composite systems. Quick assembly is another advantage, as metal deck can serve as a work platform for all trades. It is used for flooring in a wide variety of steel-framed buildings, but especially with high-rises, where it can help reduce floor-to-floor and overall building heights.

## A Different Environment

Before touring CMC, I'd visited a fabricator, a mini-mill, and a galvanizer, and I immediately noticed two key differences between those facility types and this one. First, where metal shavings, soot and ash, and condensation are the norm at these other facilities, making metal deck is a very—well—clean operation, even with painting as part of the process.

The other difference I noticed was that there was no steel piled up outside the building—no materials yard for finished product. That, says Ron Grant, the Peru location's general manager, is because the facility works on a daily schedule. Where outgoing materials can stay for days or even weeks at galvanizers, fabricators, and mills, it's pretty much off-site by the next day at CMC, primarily shipped directly to job sites; the idea is "fabricate today, deliver tomorrow." Most deck produced at Peru is slated for jobs within a 500-mile radius, although the facility has shipped deck to projects as far away as the West Coast. Grant emphasizes that every order is customized; they don't stock material for sale.

Of course, a large warehouse adjacent to the deck-making building houses coils and coils of cold-rolled plain and galvanized flat steel—the vast majority of which is manu-

## How Metal Deck is Made

Ever wonder how metal deck achieves its fluted form? Producing metal deck is a fairly simple, albeit precise, process. The below photos walk you through a typical deck job at the CMC Deck facility in Peru, Ill. The series shows the painting, roll-forming, and cutting of 48.25-in.-wide flat steel that ended up as 36.125-in.-wide metal deck. The finished product is generally shipped the next day, directly to the job site.

**1** A coil of steel is put through the painting machinery, which somewhat resembles a newspaper printing press.



**2** Three coats are applied to the steel, then it travels through ovens that dry the paint. The steel is then cooled and re-rolled back into a coil.

**3** The steel coil is put through the roll-forming line.



fabricated by U.S. Steel in Gary, Ind.—waiting to be rolled into the final product. Quality control for the steel is performed at the mill, although CMC verifies that the lengths and widths of the delivered bundles are correct.

Although cleaner and without a materials yard, the metal deck operation is just as loud as the others, especially thanks to the machine cutting the steel. As such, ear protection is the rule, along with hard hats, eye protection, and gloves.

#### Cutting Grooves

Both hot-dip galvanized and cold-rolled (uncoated) materials are used to make metal deck. The majority of uncoated material is furnished to the end user with a shop coat of primer. The process itself is fairly simple. First comes the painting, for corrosion protection and aesthetic purposes. The painting schedule is determined approximately two

weeks ahead of when the job is actually going to be rolled. Steel to be painted—mostly for roofing deck—is put through a long series of painting machinery that somewhat resembles a printing press. Three coats are applied via rollers: a pretreatment that helps the paint better adhere to the metal, a primer coat, and a finish paint coat. Two colors are available—gray (UL listed) and white primers—and any combination of colors and sides is possible: gray on one side, white on the other; gray on both sides; white on one side, no paint on the other; etc. After paint is applied, the steel travels through heating ovens, which dry it, then through a chilling unit before being rolled up into a coil again.

From here, the steel is placed in inventory, where it will stay for a day to two weeks before being roll-formed. The roll-forming process is what creates a finished metal deck product. The Metform roll-

forming lines that CMC uses are roughly 100 ft long and can run 250 ft of steel per minute with most products. A line contains four sets of rafts, which are sets of tooling rolls that create the width of the deck and the flutes. The first raft creates one flute down the middle of the steel, drawing the metal inward. As the steel travels down the line, each set of rafts create more flutes, outward from the center. At the end of the line, the steel is cut into the exact lengths required for each order. A worker controls the roll-forming line from a nearby station at this end of the machine, and another worker seated just past the shear pulls each deck piece off the line and places it into a stack as a finished product.

As we watch the worker pile up section after section of finished steel deck, Grant explains that this step in the process isn't

**4** The first flute is made in the center of the steel, drawing it inward.



**6** At the end of the line, the deck is cut with a shear machine, then is stacked and bundled, ready to ship.



**5** As the steel travels down the line, more and more flutes are created from the center out.



as easy as it looks. Each piece of deck can weigh as much as 350 lb, and stacking the pieces while getting the flutes to line up requires finesse. Grant says that the key is using the momentum of the steel as opposed to muscling it. The end result is a short, neat stack of deck, perfectly lined up, bundled, and ready to be shipped. Six loading docks provide trucks with direct access to the finished products.

### **A Good Gauge**

The majority of the steel rolled at the Peru facility is 0.028-in.-thick (22-gauge) steel that starts out at 48.25 in. wide and ends up at 36.125 in wide, although the plant is capable of working with gauges of up to 16. The rafts are removable and can be switched out to accommodate deck products of different numbers, widths, and depths of flutes. It takes about 45 minutes to change all the rafts on a line.

The facility has four roll-forming lines, three for its standard roof and flooring projects and one cell deck line for specialty products. This specialty line generally rolls a thicker gauge of steel, much of which is perforated and has an insulation bat installed in it for soundproofing purposes. The bulk of the deck produced from this specialty line is used in gymnasiums, cafeterias, and other school areas. This machine generally rolls far less steel per minute than the three main lines, and product created on this machine tends to stack much higher.

There are also machines that produce “accessory” products: end caps, flashings, etc., which are used to close in the ends of the decks at the edges and corners during installation. Grant also says that his facility has the capability to produce special accessory items as needed.

### **Room to Grow**

The Peru facility employs 55, including 12 detailers. Grant notes that CMC is committed to hiring locally, and all but a handful of the employees are from the area. He explains that employees are cross-trained for various tasks (meaning that the worker stacking the steel deck at the end of the roll-forming line doesn't have to do that all the time). All production is performed during one shift, but Grant anticipates that business will increase enough to warrant a second shift some day.

And things are looking good. The Peru facility is capable of using 75,000 tons of steel per year, and last year's production was up from the year before. MSC