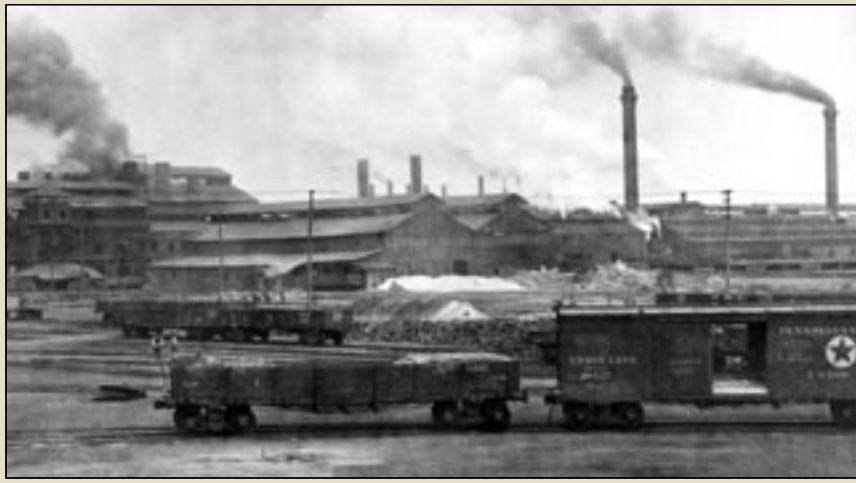


# ROLLING RAIL AT SPARROWS POINT

Rail rolling was an around-the-clock activity at Sparrows Point, with crews operating on two shifts seven days a week. The plant rolled 180-foot rail lengths, which was the longest rail rolled at the time, and pioneered the use of rail made of special alloys (titanium and Mayarí nickel-chromium) and rail rolled at heavy weights (up to 130 pounds per yard) before World War I.

Viewed in cross section, a T-rail consists of, from top to bottom, a head, web, and base. The American Society of Civil Engineers established a series of standard rail cross sections in 1893, but many railroads continued to specify their own designs, with minute differences in the size and shape of the head, web, and base. A 1900 rail catalog issued by Pennsylvania Steel, for example, listed 52 rail section numbers, most of them sponsored by an individual railroad, as well as 27 types of girder, flat, and slot rails for electric and cable railways.

The chemical composition of the rail also varied according to the customer. The Pennsylvania Railroad specified the following chemistry for its rails: 0.45 to 0.55 percent carbon; 0.80 to 1.20 percent manganese; 0.05 to 0.20 percent silicon; and no more than 0.10 percent phosphorus. The New York Central Lines insisted on a slightly different formula: 0.62 to 0.75 percent carbon; 0.70 to 1.00 percent manganese; 0.10 to 0.20 percent silicon, and no more than 0.04 percent phosphorus.

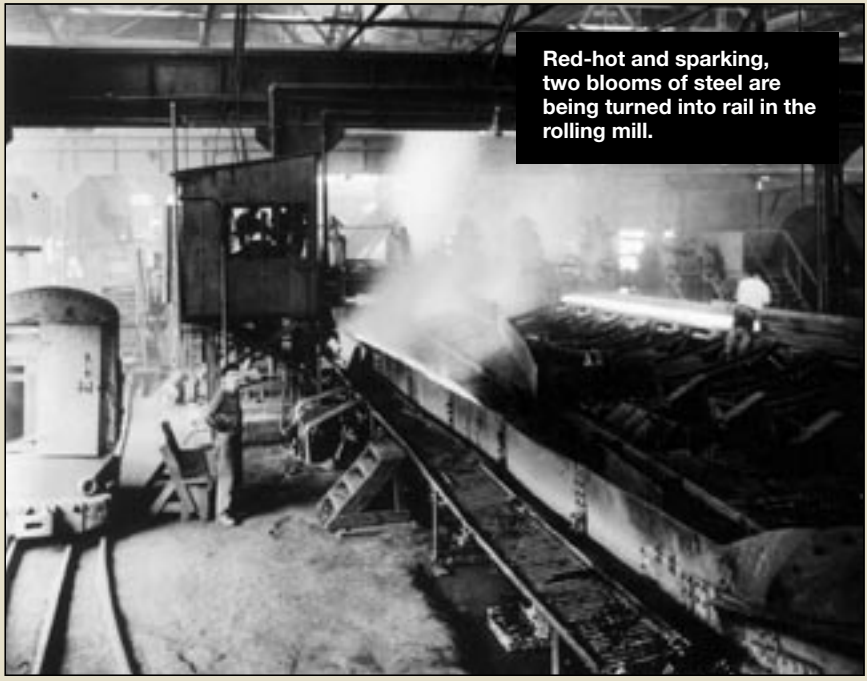
The mill at Sparrows Point was equipped with three stands of roll trains that were driven by a 2,500-horsepower Porter-Allen engine. The flywheel for the engine measured 22 feet in diameter and weighed 60 tons.

Simplified, the process worked as follows: A preheated bloom, or bar, of steel was pushed between the lower rolls of the "roughing" train, raised on a lifting table, and returned through the upper rolls of the train. The bar was then dropped back to the lower rolls for a repeat rolling.

After a total of six passes, each one progressively squeezing the hot bloom into a narrower form, a hydraulic crank raised a

*Continued on next page*


**Above, Sparrows Point works at full blast in 1902. The plant was located nine miles from Baltimore on the Chesapeake Bay.**



**Red-hot and sparking, two blooms of steel are being turned into rail in the rolling mill.**

metal arm that, much like a railroad switch, directed the rail onto an "intermediate" train of rolls, which further shaped and smoothed the steel. After three passes on this train, the rail was pushed by another arm on to the "finishing" train for two additional passes.

What had been an eight-inch-square bar of steel, nine feet long, had been reduced to the shape of a railroad rail and lengthened to slightly more than 180 feet. The total time that elapsed between the first and last roll was five minutes and 50 seconds, according to the stopwatch precision of Maryland Steel President Frederick W. Wood.

A conveyor carried the rail to the saw table, where drop saws cut the rail into six lengths of 30 feet each. (In 1905, the standard length of rails was increased to 33 feet, although many railroads continued to accept 30-foot lengths. In 1925, the standard length increased to 39 feet.)

Still red-hot from the rolling, the rails were passed through a cambering machine and bent ever so slightly at the base so that they would gradually straighten themselves out as they cooled on the "hot beds." The cooled rails were forced through another powerful press to correct any surface defects and to harden the overall molecular structure. Drill presses then drilled bolt holes at the ends of the rails for joint plates. Inspection included a drop test, in which sample rails were placed head upwards on supports, dropped from a height of between 18 and 22 feet, and then examined for deflection or fracture. If the sample rails passed the test, the order was ready for shipment—either by rail or sea, due to Sparrows Point's unique tidewater location.

All rail was branded in the final pass of the roll train. Marked in raised characters on the web of the rail was the weight per yard, name of manufacturer ("MARYLAND" in the case of Sparrows Point rail), section number, year rolled, and month rolled. While some producers designated the month by Roman numerals, Maryland Steel used a system of placing one to 12 slash marks on the web.

*—Mark Reutter*

## A MONTH OF PRODUCTION

In October 1909, the Maryland Steel Co. produced 35,191 tons of rail at Sparrows Point, enough to lay a single track of 90-pound rail between Buffalo, N.Y., and Sandusky, Ohio (245 miles). Here's what the order book looked like:

| Date of Roll | Weight of Rail (lbs. per yard) | Tonnage | Customer |
|---|---|---|---|
| Sept. 30-Oct. 1 | 61 | 1,212 | Queensland Railways (Australia) |
| Oct. 1-5 | 70 | 4,283 | Charlotte Harbor & Northern Railway (Florida); Carlisle Construction Co. |
| Oct. 5-6 | 90 | 1,022 | Reading Co.; Central Railroad of New Jersey; Ramapo Iron Works |
| Oct. 6-8 | 85 | 2,685 | Atlantic Coast Line Railroad; Southern Railway |
| Oct. 8-9 | 70 | 1,442 | Florida East Coast Railway; Augusta Construction Co. |
| Oct. 9 | 61 | 458 | Queensland Railways |
| Oct. 10-12 | 70 | 2,130 | Florida East Coast; Aroostook Valley Railroad |
| Oct. 12-13 | 75 | 2,015 | Seaboard Air Line Railway |
| Oct. 13-15 | 90 | 2,562 | Western Maryland Railway; C.R.R. of N.J. |
| Oct. 15-16 | 61 | 1,314 | Queensland Railways |
| Oct. 16-22 | 60 | 6,345 | Valdosta, Moultrie & Western Railroad; P. M. Johnson; Georgia Northern Railway |
| Oct. 22-23 | 42 | 1,214 | Queensland Railways |
| Oct. 23-24 | 70 | 1,561 | Zimapan Railroad (Mexico); Richard Honey |
| Oct. 25-26 | 70 | 503 | Georgia, Southern & Florida Railway; Carlisle Construction Co. |
| Oct. 26-28 | 100 | 3,155 | Pennsylvania Railroad |
| Oct. 28-30 | 65 | 1,762 | Texas-Mexican Railway |
| Oct. 30-Nov. 2 | 60 | 1,425 | San Juan Transit Co. (Puerto Rico); |

**Finished rails are stacked into gondola cars by an electromagnet traveling crane.**