

Each batch of steel was heated to 2,800 degrees at the Beaver Valley Alloy Foundry in Monaca, Pennsylvania.



 *How to Make...*

EXTINCT STEEL

BY KEVIN DUPZYK

A torpedo on land. That was the Pennsylvania Railroad T1 steam locomotive. The dual-engine, 6,110-hp train could hit 140 mph, only 10 mph slower than the fastest American passenger trains today. Then diesel came along, cheaper and lower maintenance, and the steam era suddenly ended. In the 1950s the T1s were scrapped. In 2013, a group of people who call themselves railfans formed the nonprofit T1 Steam Locomotive Trust. Their mission is to build a new T1—and to give it the attention and place in history they say it deserves. But to resurrect the train, they first

had to resurrect the steel that built it.

The alloy originally used to build the T1s was a nickel steel cast by a now-defunct Pennsylvania company, General Steel Castings. The trust was able to find the recipe, but no one had poured it in 40 years, so they resorted to trial and error. A foundry outside Pittsburgh, Beaver Valley Alloy, had the expertise and the Pennsylvania heritage for the job. It heat-treated the original recipe with a two-part process of normalizing—heating the steel to a critical point, then letting it air cool—and drawing (a second, lower-temperature heating). Then it tested the results for hardness by pressing a diamond-tipped rod into the steel

and measuring the resulting indentations. To fine-tune tensile strength and elongation rate (how much the steel stretches before breaking), a separate lab put foot-long test bars of the steel through a battery of medieval tortures.

Over six long months, samples went to the lab and were tested. The steel was constantly repoured and heat-treated in slight variations until it was perfect: held at a peak normalization temperature of 1,310 degrees Fahrenheit. The train won't be finished until 2030, but in February the trust cast the first of eight drive-wheels. It was an impressive specimen: 80 inches in diameter. It's the first such drive-wheel made in America in 70 years.