

FROM THE FIELD

A Trip to the Foundry

BY DAN FOLEY CONTRIBUTING WRITER

I have installed countless cast iron boilers over the years, both hot water and steam. While I may have lost count, my back reminds me every morning. The majority of these have been residential package boilers, but more than a few have been commercial sectional knock-down boilers.

I can honestly say that I have not given much thought to how cast iron sections are made and the manufacturing process. My focus was always on piping the boiler and getting the heat back on. How the boiler was manufactured and assembled was never top-of-mind.

I have never seen the inner workings of a cast iron foundry until last month. I traveled to Boyertown, Pennsylvania to tour the Peerless Boiler foundry with my Peerless rep, Jeff Riley of Coredron. Our tour guides were Mike McDonnell, vp of marketing and Rich Michael, commercial boiler specialist.

We pulled up to the factory early on a Thursday morning. White smoke was billowing from the stack, and a distinct odor was in the air. I called it the smell of cast iron but Mike corrected me. What I smelled was the bonding agent in the sand molds.

After a briefing in the training room, we walked across the street to the machine shop foundry. The machine shop is where the patterns are made for the molds. There were tools, dies and machinery that looked like it had been there forever. Most were older than I am.



Molten cast iron from furnace being poured into ladle

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The foundry was in an old building with dirt floors. It may have been dirt over the top of concrete; it is hard to tell in a building this old. Much of the process was automated with industrial machinery, but a lot of the work is still done with manual labor. Forklifts whizzed back and forth, horns beeping to warn us to stay out of the way.

As I was walking through the foundry, sparks were flying, molten metal was being poured and machinery was loudly operating. This was the sight, smell and sound of heavy industry at work.

I glanced up at one of the men hard at work. I nodded at him as if to say "hi." He looked me in the eye but said nothing. He did not have to. His look said this:

"Stay out of my way. There is hard work being done here. I am doing it, and you're not."

And he would be right. I understood and respected his attitude. He had work to do. Boiler sections to pour. So watch if you want, but don't get in his way. He was operating a motorized ladle full of 2,500 F molten metal. This required his undivided attention. There was no time to acknowledge interlopers on a guided tour.

We then went outside to see the source of the cast iron. Most of the raw material loaded into the furnace was recycled cast iron with the balance iron ore. There was a huge stack of old radiators, boiler sections, manhole covers, fire hydrants, soil pipe, and assorted old cast iron components waiting to be recycled and fed into the furnace by a huge gantry crane with a lifting magnet.

A large cast iron ball that had to be three feet in diameter caught my eye. They would lift the ball and drop it on large pieces of scrap iron and break it into smaller pieces to fit into the furnace.

We then toured another line, where they were pouring large commercial boiler sections. After the sand was packed around the pattern, two halves of the mold were bolted together and then loaded on to a chain driven conveyer. At the same time, molten cast iron was poured from the furnace into a motorized ladle that ran along a ceiling track over to the waiting sand molds. A crew of three then poured the molten metal from the ladle into

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A large gantry crane with a magnetic lift loads recycled cast iron into the furnace

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the molds using a large hand wheel. Fire shot out of the molds as it filled with cast iron. Then it was on to the next mold.

After cooling, the next step was to shake out the sand from the mold and stack the sections like cord wood. An industrial machine with an articulating arm with a claw at the end picked up the molds, shook out the sand, and then stacked up the cast iron sections. They were no longer cherry red, but you could still feel the heat radiating off the hot metal.

After the sections had cooled and excess sand was removed, they were transferred to an adjacent building for machining and assembly. Automated milling machines cut threads into the end sections and machined the mating surfaces for either push nipples or gaskets, depending on the boiler.

At another station, the sections were pressed together and held with threaded tie rods. The assemblies were then hydrostatically pressure-tested to ensure they were leak-free. The blocks then were insulated and jacketed. Burner assemblies and controls were added and wired. These packaged boilers were then crated and packaged for shipping.



Commercial boiler sections being poured

I noticed one large commercial boiler on a welded skid. It was assembled, jacketed with the burner and controls already mounted. I was amazed as all my commercial boilers have been of the knock-down variety to be field-assembled. Mike informed me that many of their large commercial clients have cranes and forklifts to handle a large packaged commercial boiler, and order them assembled to speed installation.

The last stop on the tour was the testing station, where the boilers in sections were certified by ASME inspectors. I was surprised to learn that all of the sections and assemblies were inspected and certified. I had assumed that a sample from each run was tested, but I would be wrong. Every section and block that leaves the factory is ASME inspected and certified. Each boiler section is tested at two times the operating pressure. Each block assembly is tested at one and a half times operating pressure.

We then made a short drive to Bally to see the warehouse and main offices. Packaged boilers and commercial sections were stacked floor to ceiling awaiting shipment. I noted large open spaces in the warehouse. Rich informed me that a month ago, the warehouse was full. As it was mid-September, most of the inventory had already been shipped out to wholesalers for their fall stock. Soon, contractors like myself would be installing these boilers for their customers who needed heat.

I have to admit that there was nothing that I saw that I would want to do for a living. Maybe it is because I can't do what they did every day for a paycheck. I have an appreciation and respect for the iron and foundry workers I observed that day. I also have a better understanding of what goes into the boilers my company and I install every day. ●

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