

# STEEL CASTINGS

COLUMBIA STEEL IS COMMITTED TO HELPING CUSTOMERS INCREASE PRODUCTION BY OFFERING QUALITY HIGH-STRENGTH WEAR-RESISTANT REPLACEMENT PARTS, PRIMARILY FOR LARGE MACHINERY.  
APRIL TERRERI MOLDS THE STORY.



**C**OLUMBIA STEEL CASTING CO., Inc. is one of those strong and quiet companies on the American landscape – silently doing what it does best for its worldwide customers so they can be more productive with less downtime. Certainly living up to its name, Columbia built its century-old reputation upon a steadfast commitment to deliver quality, American-made replacement parts to a wide range of industries including metallic and surface mining, aggregate, cement, scrap shredding, solid waste recycling, coal-fired power plant operations and miscellaneous manufacturers.

## Colossal Tasks

Because of the large size of the machinery Columbia Steel's customers use to do their

work, the wear-and-tear factor is extremely high, necessitating the need for replacement parts. Columbia Steel's customers depend on the company's manufacturing and engineering prowess with capabilities of delivering large-scale, high-strength, metal-cast components in a wide range of wear- and heat-resistant steel alloys and irons. These products are fully heat-treated and machined to the most exacting specifications.

Throughout the world, Columbia Steel replacement parts are at work in abusive applications such as rock crushers, in which impact and abrasion are prevalent. Other applications include grinding mills, mining shovels, and draglines, coal pulverizers in power plants, cement plant kilns and recycling shredders.

"Columbia Steel has the reputation of being America's best specialty manufacturer of steel alloy and iron alloy impact and wear resistant replacement parts for basic industry, requiring precision-machined parts," says Hobart 'Bud' Bird, chairman of the board of the Portland, Ore.-headquartered company. "This is because we work in partnership with our customers, helping them improve their operations by increasing wear life, which means they can lower their overall processing costs."

Complementing Columbia Steel's diversified product offerings are services such as a pattern shop, an engineering center, a fabrication department, a welding department, shakeout, grinding, cleaning and heat-treating capabilities, and a machining and weld-

ing department. The foundry operates eight molding lines to accommodate the size and quantity of castings being produced.

Since 1901, Columbia Steel chose a business philosophy committed to consistent management, product and industry diversification, prudent expansion, and a commitment to recycling and environmental protection. In fact, every day the company recycles up to 200 tons of scrap steel, 800 tons of sand, and 1.5 million gallons of water. It also recycles about 20,000 pounds of office paper, cardboard, pallets, wood scraps and sawdust every month, keeping it from being dumped into local landfills and using it for other productive purposes.

### Steely Might

Some examples illustrating the range of Columbia Steel's design, engineering, and manufacturing capabilities include its work with companies operating large kilns. For instance, intense heat, corrosion and abrasion in cement rotary kilns can cause nose rings to change in size and shape. Columbia Steel can help companies increase the life of nose ring castings through better-engineered parts design and choosing the right materials for the application. Proper selection of alloys for wear-resistant castings help companies in the cement industry keep production rolling and keep costs down.

Among many of the company's most notable custom orders was the work Columbia Steel did for Central Ohio Coal's Big Muskie. Built in 1969, the enormous 13,500-ton dragline machine – which was 160 feet high and 151 feet long – moved up to 39 million pounds of earth and rock every hour in order to uncover the rich coal seam 150 feet below the surface. Its powerful boom could swing 600 feet as it crept across the landscape on four giant 'shoes,' notes Bird. "It was the largest dragline in the world, for which we made the replacement parts," he continues. "They told us if they were down for just one hour it cost them \$45,000 (in 1970s dollars). They said they just wanted to keep that machine running and we helped them do that right up until the day they finally shut it down in 1999."

"Our production capabilities tend to be on the large side, and we produce castings up to 40,000 pounds," Bird says. Columbia Steel's heat-treatment ovens range in size up to 20 feet by 30 feet and nine feet high. Melt capabilities include electric arc and induction heating. Replacement parts are made of cast low-alloy high-strength steel, manganese steel, martensitic chromium molybdenum steel, heat-resistant stainless and carbon steel and chromium alloy iron. These high-strength replacement parts include cone crusher bowl liners and man-

gles, dragline chain, coal pulverizer tires for power plants, cooler grates for cement plants and rotor caps for auto shredders. The company's mold capabilities include green sand and nobake.

The company's long and illustrious heritage is shoulder-to-shoulder rich with some of the world's brightest and finest. For instance, back in the early 1970s, when the head of naval materiel for the US Navy was searching for stronger steel for deep diving submarines, he found what he was looking for at Columbia Steel. "There weren't a lot of manufacturers interested in high-strength steel at that time, but we had been producing high-strength steel along with help from International Nickel," explains Bird. "International Nickel developed this type of steel during World War II for landing struts that had to take a tremendous amount of shock for the landing bombers."

"Those developments gave us an edge in engineering our own high-strength line of products we call the H-Series Steels," Bird says, adding that previous to Columbia Steel introducing it to the market, steels with these properties had just not been available anywhere in the world.

### Custom Products – Not Commodities

Bird emphasizes Columbia Steel is a niche player making products – not commodities. He goes on to say that what helps Columbia Steel stand out is the value added to the company's products. "We've always maintained that we help our customers make money because we continually look for ways to help them get more production per hour, or longer service life on their replacement parts so they can operate longer before they have to shut the machine down," Bird says. "We emphasize that the cost for the part is

Previous page: Workers in protective clothing monitor the tapping of one of Columbia Steel's modern 10-ton arc furnaces into a ladle in preparation to create castings.

Right (top to bottom): This is Columbia Steel's largest oven used for heat treating and stress relieving castings. It features two-zone heating and computer controls to reach temperatures of 2000 degrees fahrenheit.

Glowing castings roll out of one of Columbia Steel's many heat treating ovens. Precise heat treating is a crucial step in producing long-lasting wear parts.

Columbia Steel's main foundry building is as long as two football fields and is where most of its castings are first created from sand molds. There are two additional buildings in which molten metal is poured into molds.

Columbia Steel's half-million square feet of manufacturing facilities are situated on a 90-acre site in Portland, Oregon.



minimal compared to the cost of a machine being down.

Focused on a deep commitment to the success of their customers' operations, Columbia Steel is driven to discover reasons for product wear problems. "We conduct wear studies to truly understand how a part wore and we've become very good at forensic metallurgy – which is the science of discovering why a part broke or failed," Bird explains. Worn parts are examined to find out if they've worn evenly. "If they have, that means you've gotten your money's worth."

Working closely with customers earned Columbia Steel a 2002 Gold Alliance Supplier award from Vulcan Materials Company, the largest producer of stone, sand and gravel in the United States.

Columbia's engineers and metallurgists turn to innovative design and careful alloy choice to help customers achieve improvements in their operations through wear part optimization. Among the numerous materials Columbia Steel developed for its replacement parts is Xtralloy® - premium manganese steel successful in aggregate and mining crushers which significantly increases wear life. Xtralloy has become the industry standard. It's the longest-lasting jaw and cone crusher liners alloy used in a variety of abrasive applications," Bird says. Another product providing value is Columbia's Xtend®, a bi-metallic overlay.

Bird sees more opportunities for the company to grow through partnering relationships. "We've found that partnering with certain people is a very satisfactory approach because everyone wins," he says. "We don't write a contract or anything like that – it's all done with a handshake – and if we feel we can't do business with a handshake, we know we are dealing with the wrong people." He adds that working partnerships are the preferred direction for Columbia Steel because "it works and everyone comes out a winner – our customers, our partners, and our company." 